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COMPUTERWORLD

INSIDE

Judge jilts Bells on key goals

BY ELISABETH HORWITT
CW STAFF

The first major review of the AT&T divestiture agreement loosened the regional Bell holding companies' restrictions in certain markets but denied them the ability to become long-distance carriers or develop information services.

As a result of U.S. District Judge Harold H. Greene's decision last week, users will still be unable to obtain interregional communications services from their local carriers, except in rare instances in which a waiver has been granted. And while the Bell companies may become major distributors of information services or telecommunications

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High-octane Microvaxes roll

DEC taunts IBM, claims price/performance superiority over 9370

BY JAMES CONNOLLY
CW STAFF

BOSTON — Digital Equipment Corp. tossed fuel on the already raging flames of its rivalry with IBM last week by introducing two Microvax minicomputers pitted directly against IBM's 9370 line.

DEC used its highly visible Decworld '87 show as a stage to announce the Microvax 3500 and Microvax 3600 departmental systems as well as Vaxstation engineering workstations and work group servers based on the new processors. DEC claimed this third generation of Microvaxes provides three times the power of second-generation systems and supports almost three times as many DEC All-In-1 office automation system users.

Two software houses that tested the system said last week they basically support DEC's performance claims.

DEC officials, speaking to almost 350 reporters and analysts, repeatedly compared the new Microvax systems with the 11-month-old 9370. "With the 3500 and 3600, the Microvax family now spans the performance range of IBM's 9370 Models 20, 40 and 60 at significantly lower prices. The new Microvax systems outperform IBM's 9370 Model 60 at prices below [those of] the Model 20," claimed Domenic Lacava, low-end systems group manager for DEC.

DEC also claimed that the Vaxstation 3200 and Vaxstation 3500 offer better price/performance ratios than competing systems, such as the Sun Microsystems, Inc. Sun-3/260 and Apollo Computer, Inc. DN4000.

In an unexpected move, DEC positioned the new Microvaxes above the 2-year-old Microvax II, in a slot some observers said competes with DEC's VAX 8250 and 8350 lines.

DEC assigned the same performance range to both of the new Microvaxes, rating them at 2.6 to 4.2 times the power of the Microvax II.

DEC declined to provide ratings based on millions of instructions per second, but analysts rated the Microvax 3500 and 3600 at 3 MIPS, compared with

Continued on page 124

Microvax marches on

U.S. installations of DEC's Microvax line have grown rapidly, with the Microvax II representing 95% of the total

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART: AMY J. SWANSON

1-2-3 to go unprotected

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Relenting to years of continuous pressure from corporate software buyers and users groups, Lotus Development Corp. is preparing to remove all copy protection from its next releases of 1-2-3 and Symphony.

Existing Lotus products, including the current versions of 1-2-3 and Symphony, will remain copy protected, according to users briefed by Lotus.

Copy protection will be fully removed from 1-2-3 Release 3, which is scheduled for release early next year, according to sources close to Lotus. In addition, a Lotus official said last week that 1-2-3 Release 3 may be available before MS OS/2 — if that Microsoft Corp. operating system lags behind its scheduled first-quarter 1988 release.

"There's a possibility we would release it before OS/2 if [the operating system's] availability gets blown out of the water," said Michael Kolowich, vice-president of corporate marketing and information services

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COMPUTERWORLD JOB SURVEY

Satisfaction (mostly) guaranteed

BY MICHAEL SULLIVAN-TRAINOR
CW STAFF

Diana Ericson is frustrated, both with veteran technical managers who set unrealistic project deadlines and with a lack of recognition by upper management for her efforts.

"I worked on the business side before I came over to DP," says the associate systems analyst for Northwestern National Life Insurance Co. in Minnetonka, Minn. "Suddenly, I became a very back-room part of the company."

However, like almost 80% of the more than 600 MIS/DP professionals who responded to *Computerworld*'s in-depth job satisfaction survey, Ericson says, "Overall, I like what I do."

Despite a general attitude of job satisfaction, four out of five respondents say they are frustrated with major aspects of their current positions. Chief among their complaints is ineffective or poor management, a concern one-third of the participants mention.

Improve communication

One of the top recommendations the respondents have for management is to improve communication.

"We have many layers of management, and the people who make the decisions don't come back to us to find out if we can do the job," Ericson says.

Dan Miotti, telecommunications manager at Andrew Corp. in Orland, Ill., says, "I'm generally satisfied with my position, but I'm frustrated with the amount of time it takes for the decision-making process."

Regardless of their concerns about their current positions, MIS professionals generally say they are satisfied with their chosen field. Almost 87% say they are very unlikely to change careers. Those surveyed come from a range of positions, from mid- to upper-level MIS/DP managers to systems analysts and programmers.

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IN THIS ISSUE

Write on. Highlighting last week's Seybold Desktop Publishing Conference were Adobe and Next's joint announcement of the development of an interactive software version of Postscript for use on Next's yet-to-be-announced workstation displays and printers and Aldus's Pagemaker add-in for business templates. Page 12.

Riding the relational wave. Pullout section.

Quotable

"If we can do it, anybody can."

WENDY STEEL
BRITISH POSTAL SERVICE

Commenting on difficulties in implementing DB2 at a Toronto DB2 users conference.

Toshiba changes policy in bid to block sanctions

BY CLINTON WILDER
CW STAFF

WASHINGTON, D.C. — Moving to head off potentially damaging economic sanctions by the U.S. Congress, Toshiba Corp. last week announced several internal policy changes on exporting sensitive technology.

Toshiba said it would create a division to screen potential defense-related exports and their customers in an attempt to prevent further violations of Japanese and international export control guidelines like Toshiba Machine Co.'a sale of confidential submarine propeller milling technology to the Soviet Union.

Congressional and government spokesmen were noncommittal on whether Toshiba's announcements would mollify Congressional calls for harsh sanctions against the Japanese firm. But some observers said they believe Toshiba's action will not pacify the company's U.S. critics.

"I don't think Congress will view this as any reason not to go ahead with sanctions," said Kenneth Bosomworth, president of market research firm International Resource Development, Inc. "Apologies and explanations are not going to be enough. Congress is trying to send a message to other companies and countries as well."

Toshiba's proposed screening division will report directly to Toshiba President Joichi Aoi. It will conduct compliance audits and educate employees on export controls.

In a related action, Toshiba repeated its earlier assertions that its high-level executives had no prior knowledge of the submarine technology sale to the Soviets. Two top Toshiba executives have resigned because of the affair, but their moves were seen as a symbolic gesture.

The company released a report from Big Eight auditor Price Waterhouse and two U.S. law firms that reiterated Toshiba's claim that it had been deceived by Toshiba Machine.

The report said that Toshiba Machine decided to pursue sales of its milling equipment to the Soviets after a French firm sold similar products to the Soviet Union in 1974.

CW expands West Coast staff, moves bureau near Bay Area

Computerworld has expanded its West Coast bureau staff and moved that bureau's offices to a new location about two miles away from San Francisco International Airport.

The changes are part of a broad increase in the newspaper's West Coast coverage.

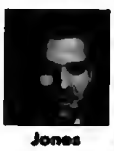
Leong

Kathy Chin Leong has been named West Coast bureau manager. She replaces Jeffry Beeler, who is leaving *Computerworld* to join Dataquest, Inc.

Leong has five years of experience covering the computer industry, most recently as the West Coast bureau chief for *Communications Week*. She was previously a senior writer at *Infoworld*.

Pitta

In addition to managing the bureau, Leong will cover high-end data communications and West Coast-based users organizations.



Jones

Julie Pitta has been appointed West Coast senior correspondent. At *Computerworld*, Pitta's area of specialization will be in microcomputer hardware and workstations. She was formerly a senior editor at *Computer Systems News*.

Martin

Stephen Jones has joined *Computerworld* as a West Coast correspondent specializing in microcomputer software and low-end data communications.

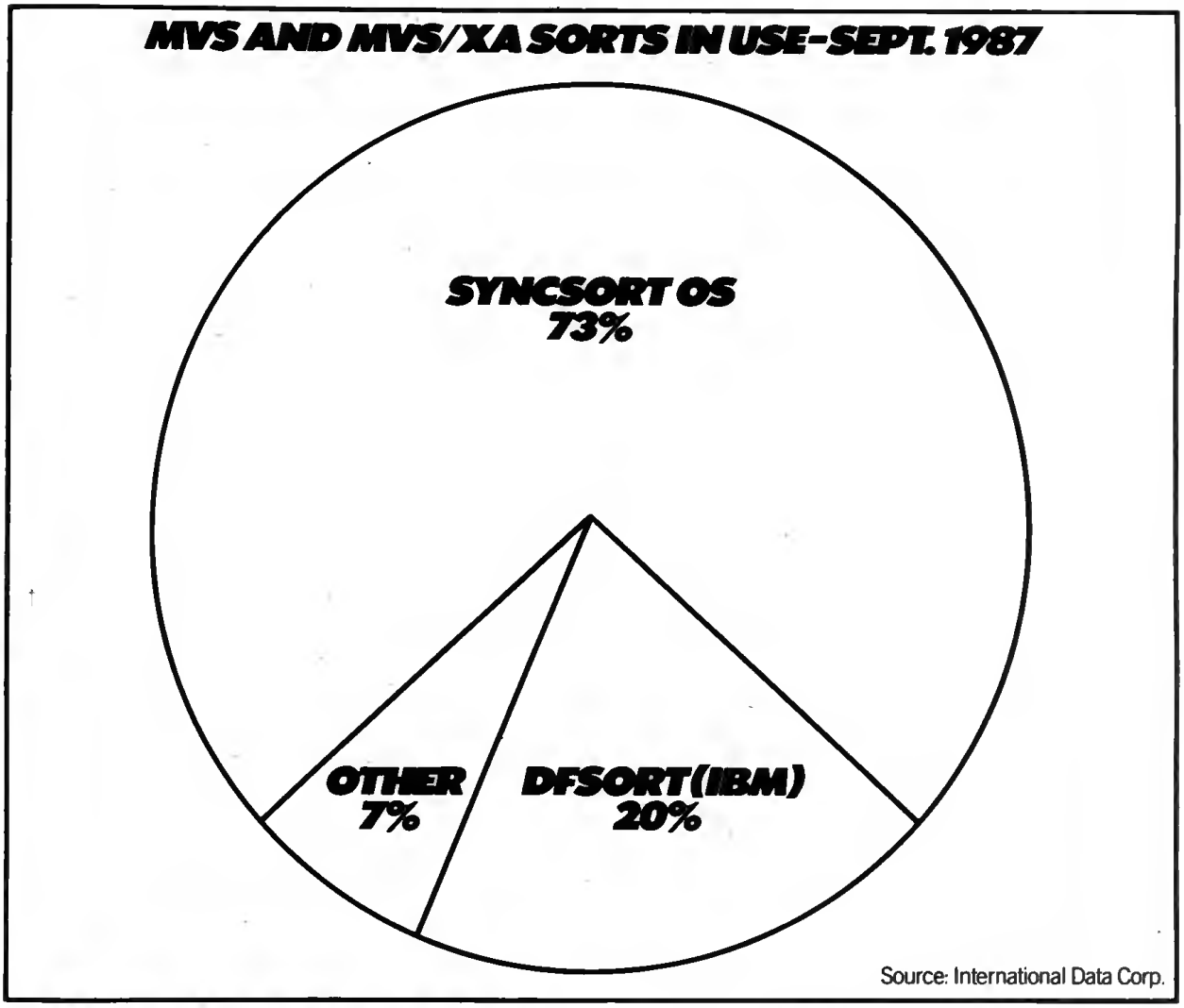
Previously, Jones held positions as a writer for the *San Jose Business Journal* and an intern at *Business Week*.

James A. Martin will continue as a West Coast correspondent covering microcomputer storage and expansion hardware, peripherals and semiconductors.

Mary Elliston will serve as the West Coast bureau's editorial assistant. *Computerworld* is in the process of hiring a sixth bureau staff member.

The bureau is now located at Suite 400, 500 Airport Blvd., Burlingame, Calif. 94010. The phone number is (415) 347-0555.

SYNCSORT OS vs. DFSORT



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Founders back off from NCC

BY DAVID A. LUDLUM
CW STAFF

The two organizations that started the National Computer Conference (NCC) have given up their direct ownership of NCC, effective next year, after failing to convince the other owners to do away with the annual event.

The Computer Society of the Institute of Electrical and Electronics Engineers (IEEE) and the Association for Computing Machinery (ACM) recently notified the NCC Board that they will give up their shares in NCC.

Under the NCC bylaws, the actions take effect at the end of the next fiscal year, Sept. 30, 1988. The organizations' shares — 15% each — will be distributed to the other owners in proportion to their current holdings.

The American Federation of Information Processing Societies (AFIPS) owns half of NCC and oversees its management. The Data Processing Management Association (DPMA) also owns 15%, and the Society for Computer Simulation holds the remaining 5%.

The IEEE and the ACM moved to give up their shares after the AFIPS board of directors defeated, by a 9-8 vote, a proposal aimed at dissolving the conference, which a few years ago was one of the world's largest trade shows.

The IEEE and the ACM, whose representatives on the AFIPS board backed the move to end NCC, still hold a stake in next year's show. After that show, they will continue to sponsor NCC indirectly, because they are among the 11 organizations that make up AFIPS.

Couldn't keep up

Roy Russo, president of The Computer Society of the IEEE and manager of the Advanced Design Automation Laboratory at IBM's Thomas J. Watson Research Center in Yorktown Heights, N.Y., said NCC failed to keep up with the times, as suggested by the show's declining turnout and exhibitor ranks.

"I think there was an inability to keep up with the changing environment in the industry — a difficulty in introducing new aspects, like keeping up with what was happening in personal computers and workstations," Russo said.

Russo said he believes the IEEE's 24-member board of governors unanimously backed dissolving NCC.

T. Michael Elliott, executive director of The Computer Society of the IEEE, said its officials are more disappointed than angry about the decline of NCC.

"Volunteers worked very hard over many years to make the conference what it was. Without casting any blame, there is disappointment that it was allowed to erode to the extent it did," Elliott said.

Concerned about contracts

ACM officials, who have now followed through on their February decision to withdraw from direct NCC ownership, are chiefly concerned with potential liabilities arising from NCC's commitments to hotels and convention centers for future conferences, according to the group's president, Paul Abrahams.

"Our main concern at this point is the possibility of liabilities if things don't go well. We do have our doubts about it," Abrahams said, adding that there are too many variables to calculate potential liabilities.

AFIPS President Jack Moshman, an independent consultant, said NCC officials hope to renegotiate contracts with hotels and convention halls for upcoming shows. The next three are scheduled for Los Angeles in 1988, Chicago in 1989 and New York in 1990.

The DPMA still backs NCC, which can survive as a smaller show under its newly installed outside management team, said DPMA President Robert Hoadley, DP manager for the City of Raleigh, N.C.

Hoadley said he thinks NCC made about $175,000 this year, which would be far lower than the millions of dollars it once made.

Fewer than 20,000 people attended the show in Chicago in June, down from a peak of more than 90,000 in 1983.

Carroll Lewis, chairman of the NCC Board and president of Commercial Data Corp. in Memphis, said he expects the actions of the IEEE and NCC to have little impact on the board. He added, however, that he hopes members of the groups will continue to promote NCC and participate in it.

Iomega seeks sales boost, revamps Bernoulli Box

BY ED SCANNELL
CW STAFF

ROY, Utah — Hoping to give its sluggish sales a boost, Iomega Corp. announced last week the long-awaited 5¼-in., 20M-byte versions of its Bernoulli Box.

The Bernoulli Box II series, which the company had hoped to deliver late last year, includes both internal and external products.

The internal products include a single-drive system that supplies 20M bytes of on-line storage as well as a slave drive that allows users to add an additional 20M bytes of internal storage.

The external products consist of a single-drive 20M-byte system and a dual-drive 40M-byte on-line system. The company is also offering an upgrade kit that it said lets users expand their single-drive external system to a dual-drive subsystem.

While the new products are compatible only with IBM's Personal Computer XT and AT and compatibles, the company said it plans to release additional kits in October that will be compatible with IBM's Personal System/2 Models 60 and 80.

Despite its smaller form factor, the Bernoulli Box II has the same capacity as the 8-in. model. Iomega said the 5¼-in. version will not replace its predecessor and that the company will continue to deliver enhancements for the original product. Iomega has shipped approximately 250,000 8-in. drives.

Like the 8-in. version, the Bernoulli Box II is removable, which enables it to play one of several data storage roles including that of primary storage, a complement to a fixed disk or a backup for primary storage.

> "We thought we had sold users on the idea of removability in 1985 and '86, but apparently not enough."
>
> KEVIN DAHILL
> IOMEGA CORP.

The vendor said it will target those markets in which the benefits of removability, such as increased data security and transportability, are important. Some of those markets include financial institutions, manufacturing companies and various government agencies.

While the company has had some success with the original Bernoulli product, its message about the advantages of removability has not reached as many users as it would like.

Iomega had sales of $116 million in 1985 and $126 million in 1986, but it has sales of only $35 million for the first half of this year.

"We thought we had sold users on the idea of removability in 1985 and '86, but apparently not enough," said Kevin Dahill, Iomega's senior vice-president of finance and planning.

Part of the problem was that Iomega was depending on dealers to educate users about the advantages of the product and should have been more aggressive in educating users itself, Dahill said.

He added that the company plans to be much more aggressive about educating its users in the future.

Iomega is also providing backup software for its single-drive systems. This permits single-drive users to make image backups to another cartridge or to copy specific files from cartridge to cartridge. The company developed the software jointly with Gazelle Systems in Provo, Utah.

All models of the Bernoulli Box II line are available immediately.

The external dual-drive system is priced at $2,499, and the single-drive system sells for $1,599. The internal single-drive system costs $1,200 with the internal-drive upgrade kit priced at $900.

CORRECTIONS

In the Aug. 24 Spotlight, the Technology Transfer Institute, Inc. (TTI) should have been listed in the chart of training suppliers. TTI, which is based in Santa Monica, Calif., offers technical seminars for data processing and MIS professionals.

The chart of service providers in the Aug. 17 Spotlight on field service should have included mention of Harris Corp.'s Customer Support Division. That division, based in Dallas, provides all hardware maintenance and support for the corporation's Information Systems sector as well as third-party maintenance, support and consulting services for a broad range of products.

The chart of medium- and large-system data base management system products that appeared in the Aug. 10 edition of Spotlight should have included the dictionary-driven relational data base operating system Reality, a product from McDonnell Douglas Computer Systems Co.

The chart of personal computer-based communications software that ran in the Aug. 3 edition of Spotlight should have included Carbon Copy Plus from Meridian Technology, Inc. in Newport Beach, Calif. The product combines PC-to-PC remote control, PC-to-host terminal emulation and Xmodem and Kermit file-transfer protocols in one integrated software package.

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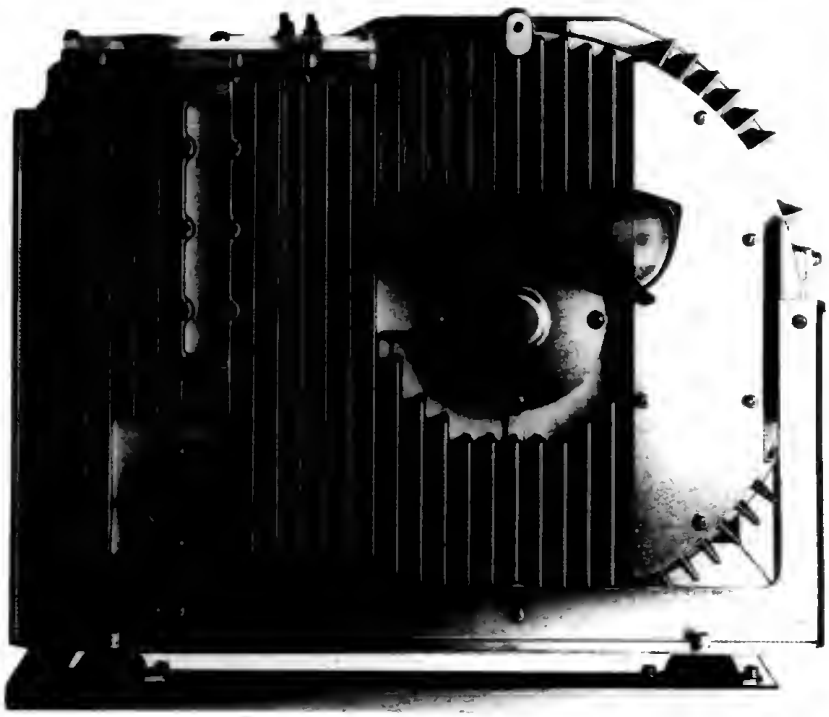

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DB2 advantages require hard sell

Development benefits over IMS seen outweighing CPU appetite

BY CHARLES BABCOCK
CW STAFF

TORONTO — IBM's DB2 consumes more machine cycles than IMS, but it more than makes up for those performance penalties in its advantages as a development environment, two early users of DB2 said last week.

However, the users said it is not easy to sell management on DB2's benefits, and they cited instances in which the relational data base had seriously slowed hardware performance.

Security Pacific Automation Co., a Los Angeles-based bank, built its first relational application in March 1985 and has since put seven banking applications into production use, according to Richard Wilson, vice-president and manager of data base administration at Security Pacific Automation, soon to be a subsidiary of Security Pacific Corp. and a spin-off business of Security Pacific National Bank.

Wilson, speaking at a Codd and Date Consulting Group conference in Toronto last week, along with a second user, Bruce Larson of Deere & Co. in Moline, Ill., emphasized productivity gains in developing applications with DB2 over similar applications with IBM's IMS.

Wilson said his firm has not documented the productivity gains related to DB2 applications but that it took a development group two years to rewrite the bank's Ready Teller system for IMS Fast Path, while an equally complex DB2 application that combined customer account information on one screen took only seven months.

In addition to allowing compressed development schedules, a DB2 application requires half as many people to develop as an IMS application, Wilson estimated in an interview.

Time lapses

Wilson said he has seen complex IMS applications cancelled after being under development for many months because the time lapse has caused them to become obsolete. "A DB2 project moves so quickly that requirements don't change before it's finished," he said.

His firm used a team approach in developing DB2 applications, tapping an end user, an application programmer and analyst and a data base administrator to form the group's nucleus, pulling in additional staff as needed. "We found having the end-user community heavily involved in the development cycle greatly speeded up delivery," he said.

The end user was involved in the data-modeling and prototype-building front end of the development cycle. In building IMS applications, "we weren't able to prototype," Wilson said.

Security Pacific Automation developed relational applications for a flexible benefit program, personal trust querying, automatic credit tracking and, its largest application, the customer information program that combines information from different accounts for one customer.

"During the modeling phase, we developed a prototype of the Customer Information Facility and presented it to a branch office. They wanted to put it into production the next day," Wilson recounted.

"The real key is to nail down the requirements," Wilson commented. In the past, IMS programmers came up with the requirements and started coding instead of establishing the relationships between the data and how it would be processed.

Not only is development time compressed, but program modifications and maintenance are also made simpler. "DB2 has afforded us a lot of time to be spent in areas other than application development," he noted.

Part of Security Pacific Automation's success in using DB2 stems from the control the firm has asserted over its use. Few end users are allowed to lodge ad hoc queries against the data base. In a case where one did, with data base administration's approval, the systems administrators left for the weekend with the query having already run a day in background processing. When they returned Monday, it was still running, Wilson said.

Stories like that frighten top management away from relational data base management systems, he acknowledged. Top management should be confronted with the trade-offs rather than allowed to reject relational technology on such a basis. "What management has to wrestle with is the tremendous productivity gains vs. the higher machine-cycle cost," he said.

At Deere, Larson's programming staff developed an application for tracking hazardous materials from scratch in a few months, but struggled for 21 months trying to convert an existing IMS application that tracks vendor claims.

Larson said the firm's IMS programmers working on the latter application spent five months making mistakes as they attempted to learn the rules of relational applications, while the group working on the first application was not experienced in IMS and learned the rules of relational systems quickly.

DB2 spreads out

IBM's relational data base is finding its way into an increasing number of sites; an estimated 1,200 total licenses are in use at these sites

INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHART

Software AG 4GL given DB2 support

BY ROSEMARY HAMILTON
CW STAFF

RESTON, Va. — Software AG of North America, Inc. last week announced plans to release a version of its fourth-generation language and development environment that supports IBM's DB2 and SQL/DS data bases.

Currently at beta-test sites, the new releases, Natural 2 DB2 and Natural 2 SQL/DS, are scheduled for availability in January. A second release that will reportedly offer a performance boost has been slated for late 1988, according to Chuck Riegel, Natural 2 product manager.

The initial release reportedly is a basic interface to DB2 that compiles Natural 2 programs into SQL statements.

The second release will provide improved performance by defining the SQL statements to the DB2 environment, according to Software AG. By defining the program to DB2, it becomes part of the DB2 environment and can, therefore, take fuller advantage of DB2 functionality.

With the first release, also known as a dynamic implementation, DB2 will accept streams of SQL statements and interpret them as they are presented to it.

With the second release, a Natural 2 application developer defines the application using a utility within DB2. Because the application is part of the DB2 environment, it can use the DB2 SQL optimizer. This provides quicker response time and an overall performance boost, the company said.

'The dynamic version'

With the initial implementation of Natural 2 DB2 and Natural 2 SQL/DS, "there won't be any steps to take before accessing the data base," Riegel said. "We're providing the dynamic version so users won't have to worry about all this stuff."

According to Riegel, the release will be offered as an enhancement to Natural 2. "It isn't a requirement, but if you're seriously looking at the DB2 environment, you'll want this," he said.

The first release of Natural 2 DB2 and Natural SQL/DS will be for CICS and IBM TSO environments. A subsequent version for the IMS environment is scheduled for availability in July 1988.

Licenses for the DB2 version range from $100,800 to $126,000, depending on the IBM processor size. The SQL/DS version can be licensed for between $22,000 and $85,000, the vendor said.

Timeplex preps to purchase packet-switch firm Cygnus

WOODCLIFF LAKE, N.J. — Timeplex, Inc. announced last week that it intends to acquire a small Texas manufacturer of packet switches, Cygnus Computer Corp. For the past year, Timeplex has been selling Cygnus's CCITT X.25 packet-switch network nodes as the Timepac product line in Europe.

The acquisition by merger depends on the approval of both companies' boards of directors. Under the agreement, Cygnus, a 4-year-old Dallas start-up with 20 employees, will remain in Dallas but will be merged into Timeplex, which will sell and support the Timepac units. Cygnus will enhance the line, develop new designs and assist in marketing the products. The move came as sales began in Canada last week. Timplex reportedly plans to begin U.S. sales in the fall.

"Packet switching is a global standard," said Ed Botwinick, president of Timeplex, "and the packet-switching technology and products offered by Cygnus bring a new level of connectivity and the broadest array of packet-switching products to our customers."

The Timepac units are X.25 packet-switched network processors. Each is based on one National Semiconductor Corp. 32-bit 32000 chip and is said to independently manage an X.25 network of computers, terminals and communications devices. "There is no central control point in the network," said Cygnus President James D. Schindler. "This is a totally distributed processor architecture, so that the loss of any one unit does not disable the network."

Timeplex expects to gain significant revenue from the sales of the Timepac products, which Cygnus had called the NP/100 and NP/200 processors. "Timeplex will realize $150 million to $170 million of incremental revenue over the next five years," a statement from Timeplex projected last week.

Oracle revamps DBMS

BY ROSEMARY HAMILTON
CW STAFF

BELMONT, Calif. — Oracle Corp. last week made what it calls the opening move in its challenge to IBM's DB2 by introducing additional mainframe features for its relational data base management system.

"Oracle has a pretty good chance of competing with DB2 because of its microcomputer and [Digital Equipment Corp.] installations," said Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y.

The announcement is the first in a series of mainframe-related introductions, said Peter Tierney, vice-president of marketing. Oracle now offers its data base management system, also called Oracle, on IBM Personal Computers, a host of minicomputers, including DEC VAXs, and IBM mainframes.

Atre said she expects Oracle to have difficulty penetrating IBM mainframe shops that traditionally "think IBM." However, Oracle "has its foot in the door" at those sites running Oracle on DEC hardware and on personal computers. "If they already have DEC, they're prone to look at vendors other than IBM," Atre said. "If they have Oracle running on a PC, they won't want to make a change."

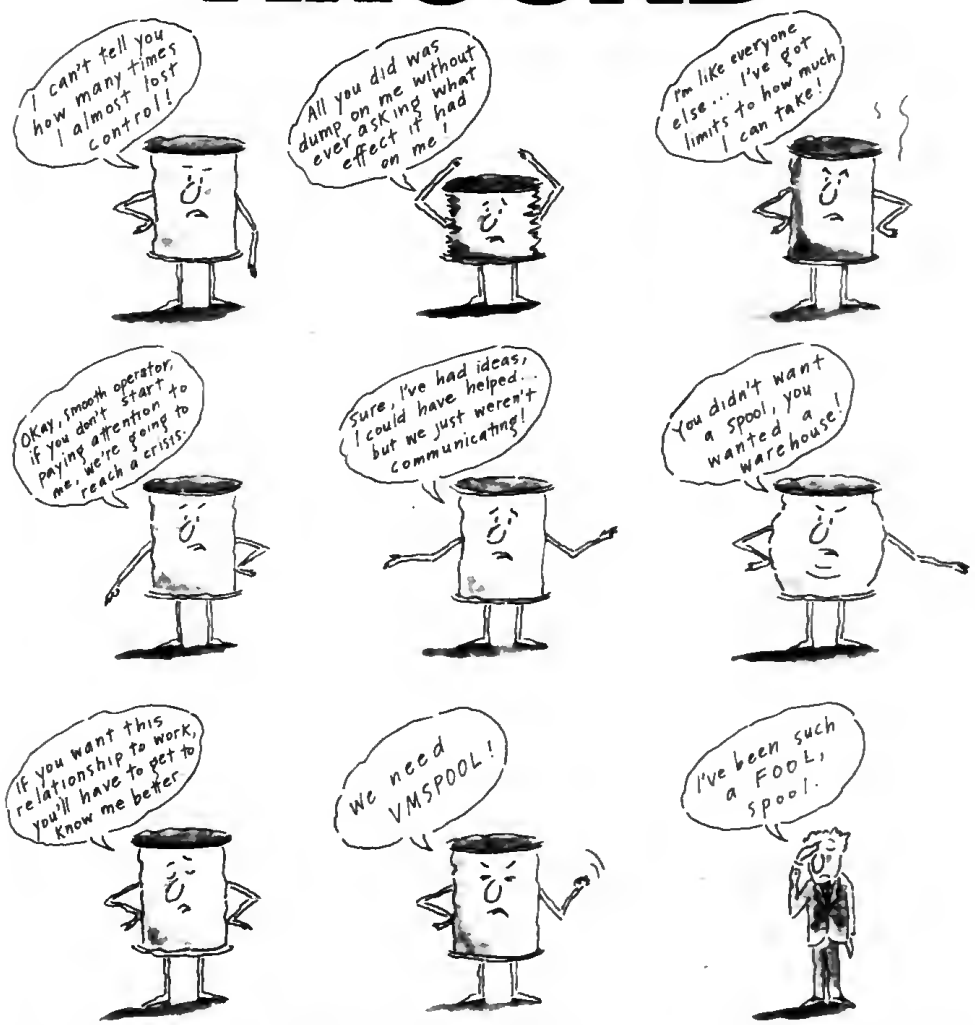
New features

Last week's introduction focused on two new features: an interface to CICS and support of the IBM MVS/XA environment. It also included enhancements, such as improved installation procedures, that will be part of a maintenance upgrade.

Both new features can be licensed for 25% of the base Oracle price, which varies depending on the hardware platform. For example, Oracle can be licensed for $100,000 for an IBM 4381 running MVS or VM. A version of Oracle with both new features would cost $150,000.

Tierney said there will be "two or three more" mainframe-related announcements before January. "Our mainframe customers are looking for more functionality, and as it becomes available we'll give it to them."

"I'M TIRED OF SPOOLING AROUND"



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Reaction to 3380 price cuts lags

Impact of reductions, low lease rates, rollouts on used market sluggish

BY STANLEY GIBSON
CW STAFF

The market for used IBM 3380 disk drives and 3880 controllers has been slow to react to IBM's recent announcement of new models, price reductions and a low leasing rate on the controllers, according to a major used equipment dealer.

"The market doesn't always behave the way you expect it to. The impact, particularly on the controller, has been less than I would have expected," said Svend Harttman, president of Computer Merchants, Inc., a dealer and lessor of used IBM equipment.

Harttman said he expected the prices of used drives and controllers to drop as a result of IBM's announcement of purchase price reductions of 8% on the 3380 disk drives and 15% on the 3880 controllers and a 61% to 67% reduction in the leasing rate for the 3880 controllers. A typical used 3880 Model 3 sells for $39,500, which is 66% of IBM's list price, Harttman said.

The triple-density 3380 Models J and K will be available in October, and the 3990 controller, which replaces the 3880, will not be available until the third quarter of 1988, according to the IBM announcement.

"Some market reactions are immediate. I thought this would be also, but we've been proven wrong. It's almost as if nothing has happened in the market for older equipment," Harttman said. He added that that could change if users wake up soon to the new prices.

An operations manager for a major data center in Los Angeles said his company will probably, on the advice of IBM, sell the 3880 controllers it now owns and lease 3880s from IBM at the new low rate until the 3990s are available. The user said monthly payments for drives being purchased are greater than the reduced leasing rates.

"That would be your best move," Harttman concurred.

Regarding disk drives, Harttman said he expects the value of used 3380s to hold up. "Old drives are still the best buy for price and performance for many customers," he said.

Used AA4s and B4s, with which the new products compete, have been rising in value during the last year. In January, an AA4 was priced at $20,000, but recently, it has been selling for $28,000. The B4 had been selling for $20,500 in January but is now priced at $26,000.

Plateau ahead

Harttman said he expects prices to level out, rather than continue to increase. He said single-density D and double-density E models are not traded actively enough to be considered a mature market.

Overall, the announcement of direct-access storage devices was received well by several users.

George DiNardo, executive vice-president of Mellon Bank NA, said he welcomes the faster channel speeds. He said wherever he has bottlenecks created by the old slower speeds, he will install new J and K drives.

"Wherever we're channel bound, we will get a new disk as soon as possible," DiNardo said. "The channel and cache improvements should run like hell. It's a winner all the way around."

"If we buy something, it will probably be a J or a K," the Los Angeles user said. "The only negative is that you can't upgrade the D or E models." He added that he had doubts whether an upgrade was feasible.

Storage control

IBM 3990 controllers and enhanced 3880 offer a range of channel speeds and cache options

	[illegible] Model 1	[illegible] Model 2	[illegible] Model 3	[illegible] Model 23
Data paths	2	4	4	2
Channel speed	3M byte/sec.	3M byte/sec.	4.5M byte/sec.	4.5M byte/sec.
Cache (in bytes)	NA[1]	NA	32M to 256M	8M to 64M
Maximum subsystem capacity (in bytes)	60G	120G	120G	60G

[1] Not available

INFORMATION PROVIDED BY IBM
CW CHART

Our intrepid scribe undertakes to install VM/IS

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — If you can read a recipe, you can install VM/IS.

That's what IBM says about its new series of primers on simplified VM/Integrated System installation. In keeping with VM/IS's departmental orientation, the manuals are directed at the nontechnical end user rather than the systems programmer who usually installs VM systems.

Last week I took on the four-hour task of installing VM/IS on an IBM 9370 Model 90 and found that a nontechnical person can indeed do the job — but not effortlessly. IBM has not formally made VM/IS available on the Model 90 but plans to offer that support.

"With the 9370, we're moving many of the glass-house applications out to the departments," said Michael Zick, manager of VM packaging, who is based at IBM's Endicott, N.Y., computer facility. "Now we feel we've come up with a new way for these departmental end users to install, operate and maintain their 9370 systems."

The "new way" consists of a series of books, titled *Planning for Your System, Installing Your System, Managing Your System* and *Reporting System Problems.* Deliberately written to about a 12th-grade reading level, the books lead the departmental systems operator — or even the casual user — step by step through each process.

The books, which have been shipped with 9370 orders since July, have been tested on university students, IBM secretaries and other nonprogrammers, according to Bernard Newcomb, VM/IS project manager in Endicott.

Normally, installation of VM/SP, from which VM/IS is derived, takes more than 100 hours of work. VM/IS installation takes four to seven hours, depending on the number of applications used, and installers need to define only 32 variables instead of 150.

The 16M-byte 9370 I worked on last week was IPLed several times, while key VM components were read into an attached IBM 9335 disk drive from an IBM 3420 tape drive.

All this was done with three system tapes, a system console, an additional attached terminal and one 251-page book, *Installing Your System.* There was also a 15-minute introductory video and an hour-long video walk-through of the system, but these were not available before the demonstration at downtown Chicago's One IBM Plaza.

Such an inexperienced programmer as I would normally not be allowed to install a mainframe software package, but IBM executives suggested the exercise as a test of the system's friendliness.

"Normally, there would be IBM systems support somewhere available," an IBM spokeswoman said last week. "Usually, those who would be chosen to install VM/IS would have some working knowledge of programming and machine operations."

In a little less than three hours, I had reached Step 13 in the 16-step installation. To carry out these steps, I read or glanced at 104 of the 252 pages of documentation.

It was going to take me longer than IBM had promised to get the job done.

In general, the instructions were clear, but the language of the VM/IS Release 5.0 commands remained a bit foreign — close to its roots in VM/SP Release 4.0. Phrases like "ipl 190 parm autocr" and "spgen map cp" kept cropping up.

Though somewhat tiring, the task was clearly achievable. The statements the user needs to type are printed in red. The text in black is intended to explain the process and lead the installer along.

After several hours of work, it seemed easier to call the computer room staff for assistance. However, IBM managers asserted that that would not work for the hundreds of 9370 machines the company would like to see installed in large corporations.

The task of describing the VM/IS installation process, accordingly, has been cut down to size. "We've used the 80/20 rule," Zick said of the VM/IS documentation. "We feel that 80% of what needs to be done can be described in 20% of the pages."

If end users do get a little confused about the 650 pages of VM/IS documentation in the four spiral-bound primers, experienced technical help is a phone call away. IBM's support staff and software engineers have access to the full VM/IS documentation — all 8,000 pages of it.

Apple seeks to tap market for presentations

BY JULIE PITTA
CW STAFF

SANTA CLARA, Calif. — Apple Computer, Inc. last week said it has formed a new business unit to target the market for desktop presentations, which the company hopes will prove as lucrative as desktop publishing has been.

Apple Chairman and Chief Executive Officer John Sculley, at a press conference during the Seybold Desktop Publishing Conference here, said Apple's role in the desktop presentation market will mirror its position in desktop publishing. Sharing the podium with Apple were third-party developers. Microsoft Corp., Interleaf, Inc. and Cricket Software, Inc.; all of the firms' products aimed at the Macintosh's desktop presentations use.

"The way to begin is to pick a few companies to ally with and pick a few products to focus on," Sculley explained during the widely anticipated announcement. "Apple's role has been to bring together third parties to offer solutions."

Industry observers said the announcement was in keeping with Apple's current strategic direction. "It's not anything earth-shattering," said Tom Bertram, a Dataquest, Inc. industry analyst. "They're taking a step forward toward their stated direction — penetrating the business market."

Strong commitment

Jeff Raikes, Microsoft's director of applications marketing, said Microsoft has a strong commitment to the desktop presentations market.

"How seriously does Microsoft take this market?" Raikes asked. "We paid $14 million for Forethought because we believe in this market."

Microsoft is expected to offer a Macintosh II version of Forethought, Inc.-developed Powerpoint, which is a presentation-organization software package. However, a Microsoft spokeswoman said no introduction date has been set for a Powerpoint enhancement.

Additionally, Interleaf introduced Interleaf Publisher, a document processing software package for the Macintosh II, representing Interleaf's first Apple-based product. The product is set to be available in November at a price of $2,495.

Cricket unveiled Cricket Presents, a desktop presentation software package for the Macintosh. Priced at $495, the product is scheduled to be available Oct. 31.

Judge jilts Bells

CONTINUED FROM PAGE 1

equipment, the actual offerings will have to be supplied by another company.

After considering comments and petitions from a variety of industry players, Greene dashed the regional holding companies' hopes of significant new freedom in key communications arenas.

Greene eliminated the need for the companies to obtain a waiver before entering nontelecommunications markets but maintained the ban on the companies' manufacturing telecommunications equipment. He promised to lift all restrictions that prevent the regional holding companies from constructing "a sophisticated network infrastructure" that can transmit information services provided by others, but he prohibited them from developing and supplying their own information services.

Long-distance still taboo

Greene also kept in place the ban on the local carriers' right to offer long-distance services without first going through a waiver process.

Greene's recommendations relating to information services still leave in question whether the regional holding companies will be able to provide electronic storage of information.

"Clearly he's said yes to transporting information and no to data processing and actual provision of data bases" by the Bell operating companies, said Brian Moir, attorney for the International Communications Association (ICA). "We are still not sure about whether the operating companies can store information and what types of transport services they can now offer that they weren't offering before."

"We think he's made a big mistake," said Peter Bernstein, a senior research analyst at Morristown, N.J.-based Probe Research, Inc. "He says OK for the Bell operating companies to spread their resources into nontelecommunications-related activities, when he should have made sure these guys concentrated on providing the best networking they could."

Seeking freedom

With the industry moving toward Integrated Services Digital Network and other enhanced offerings, "you need to allow the people with the networking expertise" full freedom to develop such offerings, "including interexchange services and the transport, access and storage of electronic information," Bernstein said.

The entry of the regional companies "could expand information services from primarily local businesses to a mass market," he added.

Several regional holding companies released statements expressing disappointment in Greene's refusal to lift the interexchange and equipment manufacturing bans. Pacific Telesis Group (Pactel) had hoped to avoid going through a protracted waiver process each time it wants to offer cellular networking across local access and transport areas (LATA); noted company spokeswoman Ginny Juhnke. "At first look, the order doesn't allow interexchange traffic on a cellular network," she said. Pactel currently is petitioning for a waiver to offer cellular services across four LATAs in the Detroit area.

In contrast, Nynex Corp. was encouraged by certain portions of Greene's document to "go forward with our waiver request," which, if granted, would allow the regional holding company to offer trans-Atlantic services, according to Nynex spokesman Richard Adler.

"The language in the interexchange part of the document indicates that [the ban will be lifted if there are] certain economic and technical changes that spur competition," he explained, noting that "there is a high degree of competition in Manhattan and Boston," the cities from which Nynex would offer the service.

In general, the ICA considers the decree to be "very reasonable, consistent with industry thinking and of benefit to users," since it allows the divested Bell operating companies to leverage their expertise in the information service area, Moir said.

"Basically, we favor everything we've heard [about Judge Greene's decision]," said Kenneth Phillips, chairman of the Committee of Corporate Telecommunications Users and a vice-president at Citicorp. "We favor anything that promotes competition."

The group also approves of Greene's decision to ban the Bell operating companies from supplying information — in particular, Phillips indicated, selling selected customer information to local businesses. "That is a privacy issue and constitutes tacit cross-subsidization," Phillips said.

The judge's decisions resulted from his formal review of the current AT&T divestiture ruling, including comments and recommendations made by the U.S. Department of Justice and various user and vendor organizations. The Justice Department had recommended that the regional carriers be allowed to manufacture and sell telephone equipment and enter the information services and interexchange carrier markets.

In a formal statement, MCI Communications Corp. President Bert Roberts praised Greene's decision to bar the Bell operating companies from the long-distance arena — in which MCI is a major player. Greene, according to Roberts, "recognized the already competitive nature" of the long-distance and telephone equipment industries and has preserved their stability until the next review of the divestiture agreement, scheduled for 1990.

Lotus strategy hamstrung by OS/2, delays

Lotus Development Corp.'s copy-protection phaseout will coincide with the firm's attempt to maintain market share by evolving its current product line and to move into new product areas.

Both of these efforts have been hampered by product delays and the continuing wait for OS/2, a next-generation operating system due out next year from Microsoft Corp.

The most important product on the way, at least in the near term, is Lotus's 1-2-3 Release 3. This entirely rewritten version of 1-2-3 will run under Microsoft's MS OS/2 and existing versions of MS-DOS. While the timing of 1-2-3 Release 3 may depend on the availability of OS/2 early next year, Lotus may not wait, according to Michael Kolowich, vice-president of corporate marketing and information services at Lotus.

Another key product is Symphony Release 3, which will be made to resemble 1-2-3 more closely. "We are converging the spreadsheet engine [of 1-2-3] so that Symphony Release 3 will start with the 1-2-3 spreadsheet engine," Kolowich said. Symphony Release 3 is expected to be available sometime next year and will run under both OS/2 and MS-DOS.

The firm will also release other versions of 1-2-3, including 1-2-3/G, which relies on the graphics user interface component of OS/2 and is set to be available late next year. Lotus is also on plan with 1-2-3/M, set for release early next year.

While spreadsheets may still provide the bulk of the firm's revenue in the coming years, Lotus will branch into the data base market late next year and will reenter the Apple Computer, Inc. Macintosh market with Galaxy, an integrated spreadsheet product.

In addition, Lotus is proceeding with Speed-Up and Learn, utilities for 1-2-3 that have fallen behind schedule but are intended to ship this year. The firm also hopes to release the Networker, which allows the use of 1-2-3 and Symphony on local-area networks, by the end of this year. In addition, the firm is expected to release a long-awaited but still unannounced product being developed by Lotus founder Mitch Kapor.

Lotus's push away from its mainstream spreadsheet segment has been held up by product delays, many of which are due to the incorporation of feedback from beta-test users, one user said.

The company is, however, on schedule with a new version of Graphwriter, dubbed Graphwriter II, set for announcement later this month. The package will contain a facility through which a permanent or semi-permanent link can be created to import data from 1-2-3.

A 1-2-3 user working for a New York brokerage firm said the improved link will help resolve one of the spreadsheet's weaknesses — less than satisfactory graphics. "This link between 1-2-3 and a graphics package is something we would expect to use," the user said.

DOUGLAS BARNEY and ALAN ALPER

1-2-3

CONTINUED FROM PAGE 1

at Lotus. "We would then provide a retrofit module to make it compatible with OS/2 once it is available."

As the last holdout among the major software vendors, Lotus has long come under fire from users for refusing to relinquish its copy-protection scheme.

But with additional spreadsheet competition, Lotus has bowed to user pressure and market realities, observers said. "When you combine competitive pressures with things like Copy II PC [a popular copy protection-busting program], you are really forced to abandon protection," said Bruce R. Watts, managing director of investment firm Needham & Co.

"If they hadn't captured the spreadsheet market, the protection would have hurt them," said Fred M. Zickert, manager of personal computers for Eaton Corp. in Cleveland, which continues to be a large user of 1-2-3. "We had too many copies installed."

Users last week welcomed reports of Lotus's decision. "It is significant and interesting and desirable," said Jim McDonnell, a vice-president for The Equitable Life Assurance Society of the United States in New York. McDonnell said he would prefer to unprotect installed software but that he accepts Lotus's decision to not provide this ability. "We knew what we were purchasing," he added.

Copy protection has become a more burdensome issue with the release of IBM's Personal System/2 family, which uses nonstandard 3½-in. floppy disk drives. Users can move unprotected software to the new media by themselves but must upgrade through Lotus to move applications such as 1-2-3. "We went to Lotus for an upgrade, and that took a long time," Zickert said.

Anti-copy protection activist Jerry Schneider said the PS/2 introduction presented an ideal opportunity for Lotus to announce the removal of copy protection. That move would have also helped thwart the potential threat from Microsoft's Excel, argued Schneider, who is president of the Capitol PC User Group, Inc. While praising the Lotus decision, Schneider added, "Coming this late, it looks more defensive than it should have been."

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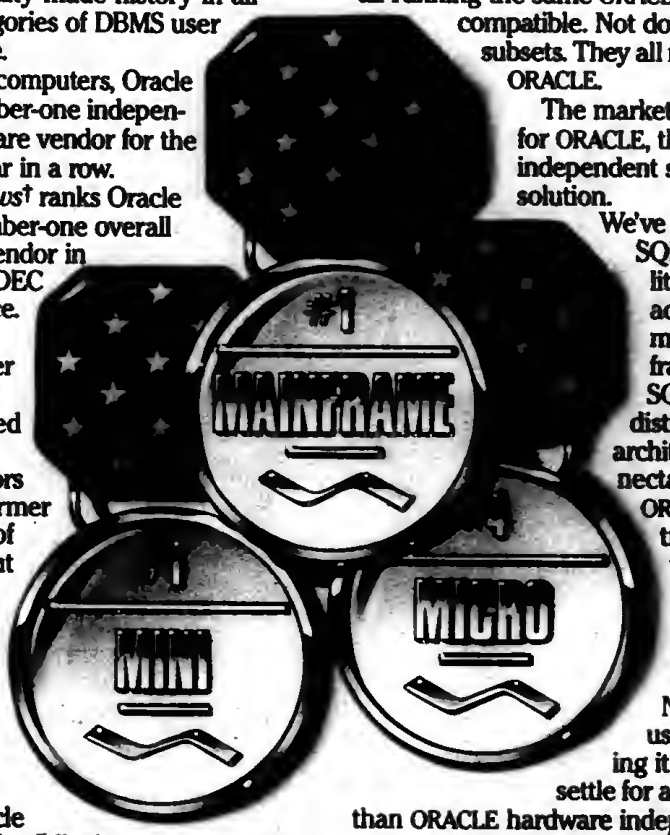

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	Traverse City	Oct 28
MN	Minneapolis	Sep 29, Oct 29, Nov 18
MO	Kansas City	Sep 22, Nov 10
	St. Louis	Sep 16, Oct 13, Nov 10
NC	Charlotte	Sep 23
	Raleigh	Sep 16
	Winston-Salem	Oct 7
NH	Manchester	Oct 21
NJ	Cherry Hill	Sep 9, Oct 29
	Iselin	Sep 18, Sep 29, Oct 8, Oct 22, Nov 5, Nov 17
	Princeton	Sep 22, Oct 14, Nov 12
NM	Albuquerque	Sep 22, Nov 5
NV	Las Vegas	Sep 9, Oct 27
NY	Albany	Oct 6, Nov 4
	Buffalo	Sep 29
	Long Island	Sep 15, Oct 15, Nov 12
	New York City	Sep 9, Sep 17, Sep 23, Oct 7, Oct 21, Oct 28, Nov 4, Nov 18
	Rochester	Sep 22, Oct 22, Nov 10
	Syracuse	Oct 15
OH	Cincinnati	Oct 1
	Cleveland	Sep 17, Oct 15, Nov 12
	Columbus	Sep 30
	Dayton	Sep 22, Oct 20, Nov 17
OK	Oklahoma City	Sep 15, Nov 17
	Tulsa	Oct 20
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	Memphis	Oct 14
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	Dallas	Sep 9, Oct 8, Nov 4
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	Milwaukee	Sep 5, Oct 14

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Rollouts sparse at Seybold conference

BY JAMES A. MARTIN
and STEPHEN JONES
CW STAFF

SANTA CLARA, Calif. — Although several vendors, including Steven Jobs' Next, Inc., expressed intentions and announced license agreements, the annual Seybold Desktop Publishing Conference held here last week yielded little in the way of actual product introductions.

Adobe Systems, Inc. and Next jointly announced the development of an interactive software version of Adobe's Postscript page-description language for use on Next's yet-to-be announced workstation displays and printers.

According to Jobs, the screen version of Postscript will simplify and enhance the end user's relationship with the language. Currently, Postscript commands are embedded in printer firmware, and users are not able to alter commands and fonts from a CPU terminal.

Display Postscript reportedly will be independent of any windowing software and will not be demonstrated until next summer. Neither Jobs nor Adobe officials would expand on the announcement.

Adobe also revealed that QMS, Inc. in Mobile, Ala., would become the first vendor to manufacture and market a color Postscript printer.

The QMS printer will reportedly be based on the 300 dot/in. Mitsubishi Corp. color thermal marking engine. QMS said it will introduce the printer during the first quarter of next year. The printer promises 35 resident Postscript typefaces as well as serial, parallel and Apple Computer, Inc. Appletalk network interfaces. Pricing was not disclosed.

Although some analysts had anticipated a new version of Aldus Corp.'s Pagemaker, the Seattle-based vendor announced only an add-in package of business productivity templates. The $99 product, called Pagemaker Portfolio: Designs for Business Communications, is aimed at corporate users who have no design expertise but desire slick-looking business documents.

The templates run with Pagemaker and include predesigned grids for proposals, memos, overhead transparencies, handbooks and business plans. The package is available for Apple's Macintosh and the IBM Personal Computer series.

Mike Fontana, a conference attendee who serves as information center director at The Hartford Insurance Co., said he plans to put the templates on his company's list of standardized products. Fontana said the package will help Hartford employees put out the company's 250 different newsletters.

"People want a tool that they can use to get their message across in a professional-looking way, but they don't want to spend a lot of time learning about graphics design," said Fontana, who has been using beta-test versions of the Aldus product for the last two months.

Several companies sought to get a foothold in the desktop publishing market by porting current turnkey systems for high-end applications down to the personal computer level. The offerings included a new version of Omnipage Corp.'a engineering workstation system, which features software that runs on all PCs based on Intel Corp.'s 80386 chip, and a similar package from Publishing Empire.

Harris to add CMOS 286

MELBOURNE, Fla. — Harris Corp. is scheduled to introduce this week what it claimed will be the first CMOS 80286 microprocessor to provide manufacturers of desktop and laptop systems full compatibility with IBM's Personal Computer AT.

The chip, called the CG80C286-12, will have a maximum clock speed of 12.5 MHz and will be fully compatible with the NMOS version of Intel Corp.'s 80286, including support for multitasking. Harris said it will have samples of a 16-MHz version of the product available in the fourth quarter.

With its static design, the product is well suited to battery-operated laptop systems, according to the company.

The chip provides systems-level power savings of up to 90%, according to Harris.

'Obvious interest'

Asked if leading laptop makers, such as Tandy Corp. and Zenith Data Systems, have an interest in incorporating the chip in future systems, Michael Graff, vice-president of marketing at Harris's Semiconductor Products Division, declined comment, but he did say "there is an obvious and great interest from all the manufacturers of laptops."

Other markets in which Graff said he expects the chip to do well include battery-operated instrumentation, robotics, military and "harsh environments where sealed boxes are required."

Cost of the CG80C286 ranges from $125 to $170 each in quantities of 100 to 999, according to the company.

NAS claims AI system sniffs out potential mainframe disk crashes

BY STANLEY GIBSON
CW STAFF

SANTA CLARA, Calif. — National Advanced Systems Corp. (NAS) last week announced what it called the first expert system designed to predict failures in mainframe-type disk drives.

The Nastrack system, which consists of a single hardware board and software that is installed in the head of a string of drives, monitors seven performance parameters of NAS drives and sends performance data via a modem to an NAS support center in San Diego. The information is sent in batch mode on a daily basis.

"The system in San Diego sifts through the data and identifies what is out of the norm," said Charles Molloy, an NAS spokesman. Information that might indicate an imminent failure will alert a specialist who, in turn, can dispatch a customer support representative to the site in order to prevent a failure, according to Molloy.

"I think this is one of the critical components that people in the disk market will need," said Gerald Atterbury, a vice-president at Dataquest, Inc., a San Jose, Calif., research firm.

Not the first

Although Nastrack may be the first system of its kind for mainframe-type drives, it is not the first such system altogether. Atterbury pointed out that Digital Equipment Corp. currently offers a software product called the VAX System Integrity Monitor, which similarly flags errors that might indicate potential failures and then sends the information via a dedicated phone line to a DEC service facility.

"NAS and DEC may not charge their customers for this, but it can really help sales," Atterbury said. "One of the worst things is not being able to get to a portion of your data. This is a very cost-effective way to keep data on-line."

Nastrack is available to all U.S. customers at no charge. However, customers must install a dedicated phone line at their own expense in order to send information to NAS's customer support center.

Nastrack has been installed in two customer locations and at three NAS sites.

Molloy said testing performed has demonstrated that the system works, but not enough data has been gathered yet to show an improvement in performance reliability. NAS said it plans to use information gleaned from the program to design future enhancements to its disk subsystems.

HP will extend printer language

SANTA CLARA, Calif. — Hewlett-Packard Co. last week disclosed its intention to extend its proprietary Printer Command Language (PCL) to non-HP output devices.

In a statement of direction at the Seybold Desktop Publishing Confereace here, HP announced agreements that license five vendors to implement PCL on their printers or typographic systems. The licensees are Compugraphic Corp., Olivetti USA, Tandem Computers, Inc., Tegra, Inc. and Wang Laboratories, Inc.

Last week's announcement marks the first time that HP has made PCL available on other vendors' equipment, according to Roger Archibald, a product marketing manager with the firm's Boise, Idaho, division. Previously, the company had restricted the language to its own Laserjet family of printers.

The licensing arrangement also brings Laserjet compatibility to output devices that are better suited to niche applications than the HP printers themselves.

COS ships first OSI test package

BY KATHY CHIN LEONG
CW STAFF

MCLEAN, Va. — After more than a year in existence, the Corporation for Open Systems (COS) reached its first milestone last week when it shipped its initial software product designed to test Open Systems Interconnect (OSD protocols.

COS, a nonprofit standards organization, fulfilled its promise to members by offering the first release of the Transport Protocol Conformance Test System.

The $20,000 package, which runs on a Sun Microcomputers, Inc. Sun-3/160 workstation, is said to enable vendors to test their products for conformance with the transport layer of the OSI model, known as Level 4.

COS officials stressed that the software will support products that address the lower layers, specifically the CCITT X.25 packet-switching protocol and IEEE 802.3 and 802.4 specifications for wide- and local-area networks.

Developed jointly with the National Computer Centre in Manchester, England, the software will be offered to members first and then to nonmembers at a higher price, which is yet to be determined.

While COS officials would not disclose who is using the product, they did say several of the largest computer manufacturers have ordered the software. COS is not a direct sales organization but is taking orders via telephone for interested parties.

Touch Communications, Inc. in Scotts Valley, Calif., an OSI software developer, seems to be anxious to get its hands on the COS software. As a member of COS, Todd Corenson, Touch product marketing manager, said the test software will accelerate acceptance of OSI in the industry and help vendors, including Touch, speed up OSI product development.

"We are all for this product and absolutely intend to use it," Corenson said. "To date, no one has set up formal testing tools such as this, and COS is leading the way."

The package is just one step on a long and costly road to product interoperability, a major COS goal. Before vendors can use the software, they must attend a five-day training course that costs $1,200 for members and $1,800 for nonmembers.

Putting on a show

The software testing program is also a prerequisite for COS members wishing to participate in the Enterprise Networking Event '88 International next June. At the Baltimore meeting, vendors from the MAP/TOP Usera Group and COS will link their devices together on one network for an interoperability demonstration.

According to Ted Manakas, COS product manager, the transport software represents the first in a line of COS conformance products.

An FTAM conformance program will be delivered in November, and similar Message Handling System software will be shipped in December, noted Karl Litzenburg, vice-president of information systems.

Signing up

After vendors use the COS software products to ensure that their products conform with all seven levels of the OSI model, they can sign up for a COS conformance service to be offered in mid-1988.

Under the conformance service, vendors return to COS headquarters for an official test to obtain COS certification, "similar to the Underwriters Laboratory seal of approval," Manakas said. There, engineers will take the vendors' products to verify conformance with COS test software.

Corenson acknowledged that the COS certification will be beneficial to vendors supporting OSI but had reservations about how COS will price the service. "If we test a product and later modify it, I would find it stiff to have to pay for testing all over again," he said.

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Data base set to list used DP equipment

Start-up claims network will let MIS skirt dealer mark-ups; focus on IBM mainframes

BY CLINTON WILDER
CW STAFF

ATLANTA — A networked data base to help MIS executives sell used computer gear directly to other users is scheduled to be unveiled today by a start-up based here.

Named Usernet and marketed by Usernet, Inc., the network is intended to allow users to bypass the markup costs of buying and selling used equipment through traditional computer dealers and brokers, according to Usernet executives. The network is aimed at large DP operations running primarily IBM systems and peripherals. The criterion for listing in the data base is that the equipment must be relevant to the mainframe user.

"Because of the drastically high markups that some of us have seen from third-party dealers, we want to bring users together so they can buy and sell their own equipment and negotiate their own pricing," Usernet President Tom Cobb said.

"We will also make sure the transactions are properly managed — that the contract is good and the equipment is maintenance-certified by the manufacturer."

CDLA jeers

The Usernet concept drew a cynical response from Robert Gulko, chairman of the Computer Dealers and Lessors Association (CDLA).

"It makes sense conceptually until you look at the reality of how these transactions are done," Gulko said. "If a user has disk drives for sale now and the buyer doesn't want to install them until December, would the seller get paid now? The leasing companies and brokerage firms are geared to handle those situations because we keep inventory."

Gulko also asserted that there is a threat of a myriad of contract squabbles. "There are a lot of things that can happen outside the contract — maintenance issues, equipment being damaged in delivery, late deliveries, specifications out of line," he said. "I don't think the end user handling two or three transactions a year is equipped to handle all of that."

All this and consulting too

But Usernet officials said they will provide the expertise in managing transactions, advising both parties on contract structuring and other relevant details.

"We will also look for other markets for the users' equipment, such as value-added resellers and third-party maintenance firms looking for parts," said Bob Graham, Usernet's vice-president of sales and marketing. "We can provide a market for out-of-service equipment."

The Usernet data base can be accessed by any ASCII device with an asynchronous communications link. The cost of the service is $160 for installation and $60 per month or $600 per year.

For transactions, both the buyer and the seller pay Usernet a commission of between 2% and 5% of the purchase price. If a user performs a transaction through Usernet in the first year, the subscription fee will be refunded.

Graham said the data base may also include computer industry news, wholesale pricing information, news from the Data Processing Management Association and possibly third-party advertising.

European airline reservations to run on 3090s

BETHESDA, Md. — IBM's Federal Systems Division last week disclosed details of its $100 million agreement to provide the fledgling European airline reservation system, Amadeus, with hardware and systems software.

The system will reportedly run on IBM 3090 mainframes with Transaction Processing Facility control software and a data base residing in IBM 3380 storage devices.

The mainframes will be linked with the Amadeus partners' individual reservation systems and four travel agency networks by a network that is based on CCITT standard X.25 in addition to International Airline Telecommunications Association protocols covering layers four to seven using an Open Systems Interconnect model.

IBM, which helped develop American Airlines' Sabre reservation system in the 1960s, will adapt application software that will be supplied by Texas Air Corp., which operates Continental Airlines and Eastern Airlines.

Amadeus was formed in July with a $300 million agreement between Air France, Iberia, Lufthansa and SAS. These companies will own and operate the system.

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James A. Erd
Information Center Manager
Mining Machinery Group
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Reduced MIS dependency has led to increased efficiency. Joy's PC-based system has integrated the activities of 12 locations coast-to-coast and cut MIS overhead by $125,000. Every day Joy's Mining and Machinery people unearth greater profit potential. C/ICMS has helped in Joy's financial area by cutting the quarterly budgeting process by 30%. And end-users at all sites can now access corporate systems for better control of financial statements.

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Microsoft gives IBM PC the Works

BY KATHY CHIN LEONG
CW STAFF

REDMOND, Wash. — In a calculated move to attract first-time users and price-sensitive buyers, Microsoft Corp. last week announced its first integrated software application for the IBM Personal Computer.

Originally developed for the Apple Computer, Inc. Macintosh as Macworks, Microsoft Works for the IBM PC includes the same word processing, communications, data base and spreadsheet applications as the Macintosh version but features an added spelling checker program, macros and a computer-based training diskette.

According to product manager Bruce Jacobsen, the company experienced great success with Macworks when it hit the market a year ago. Compared with all its other programs, the $29S software represented the company's biggest seller the first month it was on the shelves. Now Microsoft is looking to bank on that winner by pricing the IBM PC version, informally referred to as PC-Works, lower than the Mac product at $19S. Jacobsen said Microsoft is readying an updated version of Macworks to include PC-Works' additional features.

PC-Works, slated for shipment in October, will initially run on Intel Corp. 8086- and 8088-based machines operating Microsoft's MS-DOS. Users will need a minimum of S12K bytes of random-access memory, two 360K-byte drives and a color graphics adapter or Hercules Computer Technology, Inc. graphics card. Unlike the Mac version, PC-Works provides file compatibility with Microsoft Word and Lotus Development Corp.'s 1-2-3.

Sold via retail channels in 3½- and 5¼-in. disk formats, the program will be carried by Zenith Data Systems and Tandy Corp. computer stores. Zenith will resell PC-Works as an application to run on the Zenith laptop computer, according to Jacobsen.

Don't rule out OS/2 version

Whether a version will be created for IBM's OS/2 has yet to be determined. "We are positioning this product as an entry-level package for new users in small businesses and schools and to executives who have yet to learn how to use a computer," Jacobsen said. "OS/2 is still a while off, and we will have to see how this product does on the market."

PC-Works will be the only integrated program from Microsoft, Jacobsen noted. "Offering another integrated product would only be counterproductive for us," he said.

While the four applications are not as sophisticated as single products, Jacobsen stressed that PC-Works has more than enough capabilities for the user who must attend to a variety of tasks during an average workday.

CAD/CAM tool gets revamp

BEDFORD, Mass. — Computervision Corp. is scheduled to introduce tomorrow a revamped release of its computer-aided design and manufacturing (CAD/CAM) software.

Cadds 4X Release 3.0 includes a number of new modules for mechanical and electronic CAD as well as enhancements to Computervision's data base offering, Product Data Manager (PDM). Release 3.0 also has new features for CAM applications.

Computervision said Release 3.0 is available immediately. Current users will be charged for new modules, while upgrades to existing modules will be provided at no extra charge, the vendor said.

The software, with the exception of PDM, runs on the Sun Microsystems, Inc. 68020-based workstation platform. PDM runs on IBM mainframes or Digital Equipment Corp.'s VAXs.

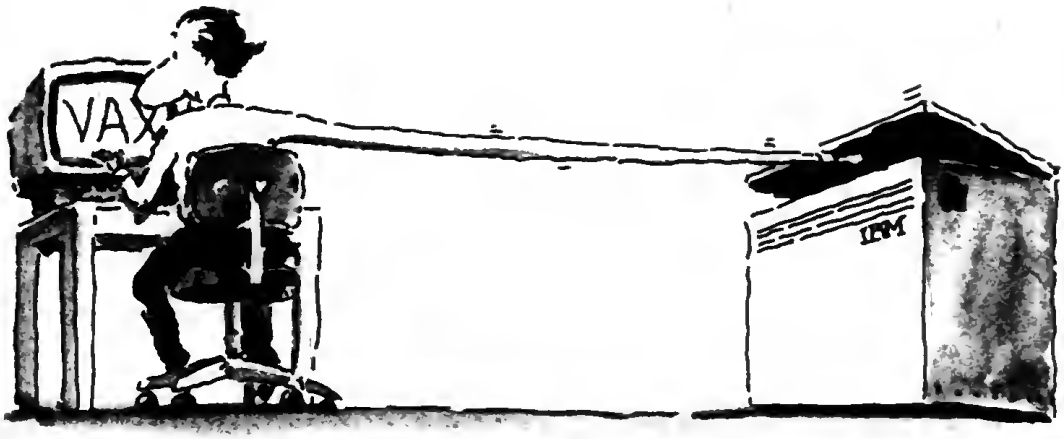
A Computervision spokesman said the company will announce within a month whether it will port its CAD/CAM software to the reduced instruction set computing-(RISC) based workstation Sun introduced in July.

Increases control over CAD data

The enhanced PDM is said to increase the control a department has over CAD data. For example, Command Lists can be created that allow a manager to specify which PDM commands a user may execute. A manager can also set up Authority Groups, which assign different levels of authorization to engineers.

Current PDM users will receive the new release free of charge, the vendor said. For new users, licenses start at $70,000, depending on the hardware platform.

Among the new mechanical CAD offerings is the Nurbs Surface Design module, a tool that is said to allow users to model complex sculptured surfaces such as automobile bodies. Nurbs is a more advanced version of the current Advanced Surface Design module, the company said. New licenses cost $5,000 per copy.



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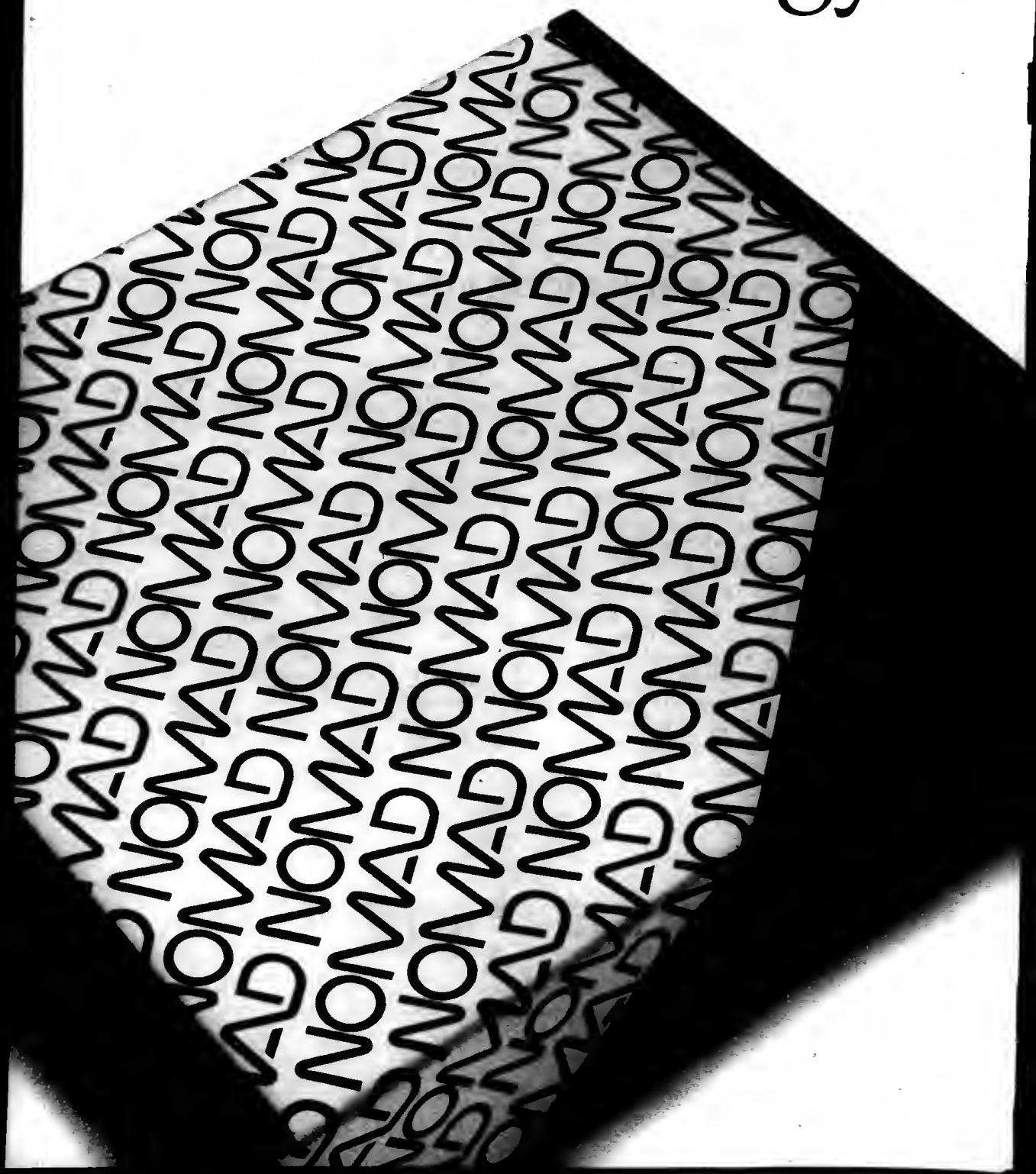

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EDITORIAL

DEC'd out

The software engineering manager at DEC puts it this way: Until recently, DEC managers were cautioned against doing anything that might "rile" IBM. "You know, let's just do our thing and not bother them," he says.

Now there's a different tune being played internally at DEC. "They're telling us to confront IBM — to practically go out of our way to, not to step out of the way," the DEC manager says. "We're feeling pretty good about this."

An awful lot of people are feeling good about DEC at its Decworld extravaganza in Boston. Featuring the Queen Elizabeth II as a floating hotel, Decworld is a single-vendor, invitation-only show for 30,000 guests that has the company's competitors green with envy.

What can you say about a $9 billion company whose double-digit growth in fiercely competitive markets has surpassed the wildest expectations? You say the company's been doing something right. That something is serving the needs of its customers at least as well as any of its competitors.

What DEC did best was neatly summarized by Gordon Bell, ex-DEC vice-president and father of the VAX strategy. While many vendors, most notably IBM, were featuring a melange of product lines that segmented the user base or filled application gaps, the VAX concept provided a reasonably compatible, single-interconnection environment. And DEC's third-party cooperative marketing programs are reaping great rewards in the applications development area.

But no one stays high forever, and DEC is facing formidible challenges, most of which emanate from within the company itself:

- DEC's own arrogance caused it to miss a ride on the PC bandwagon. What will it do about OS/2 support?
- Its sales force just doesn't measure up to the efficiency of IBM's.
- Peripheral offerings have many users shopping at third-party stores.

Still, it's hard to knock success. Even harder, though, to make it last.

Staffing up

As you will see from our article on page 2, *Computerworld* has greatly beefed up its editorial staff on the West Coast, with five full-time reporters to be working out of our new Burlingame, Calif., offices.

With the expansion of this office, we now have an editorial staff of 57 in the main office as well as four bureaus. This is a staff considerably larger than that of any other journal written for computer professionals. It is with this kind of investment that we will endeavor to maintain the high editorial standards developed over our 20-year history.

LETTERS TO THE EDITOR

Still on the board

The article about the Federal Bureau of Investigation's National Crime Information Center (NCIC) [CW, July 6] was a good one, although slightly misleading. There was an implication that the NCIC Advisory Policy Board had approved certain proposals.

The board asked for ideas from justice professionals in every state on how NCIC could do a better job and more wisely use our tax dollars. We recently referred some of those ideas for detailed study. The board needs a great deal more information before a recommendation can be made to the FBI as to any NCIC improvements.

There has been no FBI proposal to expand NCIC, and the Advisory Policy Board has not recommended any change. We will not hesitate to make recommendations when and if we determine there is a reasonable, lawful and economical way to improve the program with the support of Congress and the vast majority of responsible Americans.

W. Gray Buckley
Chairman of the NCIC
Advisory Policy Board
Denver

Lost standard

James Bradley's data base management system article in the Spotlight section [CW, Aug. 10] contained the mistaken idea that Structured Query Language (SQL) is a language. Many recent opinions would categorize it as a common specification for data base access or a data base sublanguage, and we can safely conclude that it is not a language in the normal sense.

We could apply the old Codasyl term data manipulation language or maybe the Codasyl term data definition language, but we should probably apply both. C. J. Date is of the opinion that keeping the two functions separate is archaic.

In view of this, Bradley's elevation of SQL to the status of a nonprocedural language must be qualified as a nonprocedural sublanguage. In defense of Cullinet Software, Inc.'s IDMS/R, the syntax and ability of SQL to be nonprocedural is no more nor less than that of IDMS/R.

In this age of name games, we must all work to clarify the misunderstanding that vendors, the ill-informed and consultants use to sound better than they are.

Bradley should also be aware that IDMS/R is just one of a variety of other relational systems that is implementing the SQL syntax.

It remains to be seen just how good Cullinet's implementation will be, but the notion of a standard SQL seems to be lost.

Harold Kleven
Manager of Data
Administration
Super Valu Stores, Inc.
Eden Prairie, Minn.

This week in history

Sept. 12, 1977
Chicago Stadium managers install an automated ticket printing system that enables stadium officials to order a limited number of tickets from outside vendors and print additional tickets in-house as needed. The minicomputer cuts production and printing costs and, when fully operational, allows officials to maintain mailing lists and offer expanded customer services.

Sept. 13, 1982
A federal judge rejects a government request to seal files detailing IBM's role in a Federal Bureau of Investigation trade secrets sting operation against Hitachi Ltd. and Mitsubishi Electric Corp. The decision allows defendants in the espionage case access to an assortment of IBM documents and requires the government to disclose the identity of the sting operation's informants.

Joint effort

We appreciate your reference to the Paine Webber, Inc./Computer Decisions survey of MIS attitudes that we conducted in June among 1,200 data processing managers [CW, July 13]. However, we would like to point out that this is a joint effort between Paine Webber and Computer Decisions, and the data is processed by SPSS, Inc. A lot of work goes into this survey, and we feel that all parties involved should be referenced.

Stephen K. Smith
First Vice-President
Paine Webber, Inc.
New York

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Relating to relational DBMSs

Knowledge of what 'relational' means will lead to improved productivity

EFREM MALLACH

New users often think that if a package can connect (or relate) files, it's a relational data base manager. If it can't, it's a file manager. They also think these two categories cover all the bases. They've never heard of any other kind of data base management system.

New users think "relational" has to do with relating one piece of data to another. Does a data base manager use links to connect a record with its parent? Fine — that's its way of establishing a relationship. See the link, the connection, the relationship? The data base manager is relational.

Veteran users know better. "Relational" comes from "relation," meaning a data table. The "how relational should relational be?" debate has raged in these pages for years.

However, that question is not the issue to new users. A woman who coauthored one of the industry's best microcomputer guides put it in a nutshell when she said to me, "So it isn't technically relational. What difference does it make to me?"

What matters to users

Good question. We should question the emperor's clothes. If something matters to users, let's focus on what matters and why. Then people will see the need for the distinction and use the terms correctly.

If it doesn't matter, pedantic nitpickers should get off their soapboxes and let real people get on with their jobs.

The fact is that relational does matter. Relational data base managers do things that other types of data base managers cannot do or can only do with great difficulty, such as the following:

- They provide a simple, uniform interface for users. Everything is a flat file. Data files are flat files. Users can create new views of the data, which will then act like still more flat files.

Query responses are flat files and can be reused in turn. Reports are flat files and are suitably formatted. There are no special-purpose "lookup files" to convert part numbers into descriptions or state codes into fully spelled-out names.

- They eliminate major programming hassles. There are no road maps of the links to learn, making the user navigate one record at a time. Fields are compared, tested and matched.

Entire tables are manipulated as single units, so there is no record processing to program and no end-of-set exceptions to deal with. It is easy for a novice to understand, yet behind-the-scenes mechanisms can make the process efficient.

- They deal with previously unplanned relationships. Suppose supplier, customer and employee files reside in a relational data base. We can locate the suppliers that are also customers. We can see which cities have suppliers and customers, and how many, to set up regional warehouses. We can find which employees live in the same cities as customers.

We can do this even if, in defining the data base, we did not put in these connections. And we can do them without navigating the links or writing programs that will read several files and compare fields for a match.

- They deal with complex relationships. In a political data base, a candidate's record may belong to the state's record as "favorite son" while the state's record also belongs to the candidate's as "place of birth."

These circular paths are impossible to implement in a hierarchical data base and tax most network-style data bases. In a relational data base, they are trivial.

- They rearrange connections. Since the connections aren't there, as far as the user is concerned, they never have to be changed. Did the patient switch doctors? Just change the doctor code in the patient record. The patient record does not have to be unlinked from the physician record and relinked to the new one.
- They provide extremely high performance. This point goes against the conventional wisdom, much of which is out of date but persists nonetheless. Modern relational technology, which a few vendors now have and the rest are developing, handles transaction processing with ease.

A good relational DBMS can outoptimize almost any programmer in accessing a complex data base and reoptimize automatically when storage structures change. Relational data bases, because of the inherent parallelism in their operation, can also exploit modern parallel architectures more easily than other types.

- As long as they are properly defined, relational data bases have a solid mathematical foundation that ensures certain desirable characteristics.

PAUL MEISEL

None of these points is meant at all as a put-down of the hierarchical or network data base managers. They have done a fine job for decades. However, the relational approach obviously has real pluses.

That's why people adopted early relational DBMSs despite performance penalties.

That's why IBM overcame its long-standing IMS preference and brought DB2 to practical use: Users had voted with their checkbooks for other vendors' relational products.

That's why relational DBMSs dominate data base management on minicomputers. Some relational DBMSs are available for some microcomputers today.

More DBMSs are coming that have evolved from nonrelational packages, been brought down from minis and developed from scratch. People who use them will, all things being equal, develop better and more flexible applications, more quickly and more easily.

That's the difference. That's why being relational matters and why we should keep our terms straight.

Mallach teaches at Boston College School of Management and is a consultant to top user and vendor executives. Much of his consulting work involves systems selection and competitive analysis.

The looming disaster of software standards

READER'S PLATFORM

CARL CARGILL

In a small committee in West Germany, rules are being prepared that may make much of the world's software obsolete.

These rules are not being prepared by archetypal mad scientists but by a group of well-intentioned, motivated (albeit prematurely) software ergonomists. They may be able to create rules for ergonomic software that will delay, confuse and generally disrupt the entire information technology industry.

Ergonomics — the scientific study of work — is a discipline that is becoming a major influence in the business world. Its concepts are not new; the phrases "fit the tool to the task" and "fit the tool to the worker, not the worker to the tool," are now standard in the workplace.

The newness of ergonomics is that it is now a discipline in and of itself, divorced from the areas that initially gave rise to its founding, such as manufacturing or military weaponry design.

Ergonomics is important to the information technology industry. Everything from keyboards to office chairs has been studied, measured, quantified, improved and even standardized to some extent.

Sensory and perceptual studies have improved the design of computers, making them easier to build, use and maintain. In nearly every instance, the quantification of information has provided a basis to help people better perform a physical task.

Computer perceptions

Of late, however, a new field of ergonomics has developed — software ergonomics. While the field can make definite contributions to the way people perceive and use computers, the attempts to create ergonomic standards are extremely worrisome.

The effort has already been formally initiated in Europe, with the Deutsches Institut fur Normung e. V. , the West German standards society, driving the effort. The West German union influence — participation in management — is one of the major forces in this activity.

Unlike its hardware counterpart, software ergonomics is largely a cognitive discipline — it anticipates the way people think. A software standard could, in the name of making software easier to use, mandate field placement, the arrangement of menus or the definitions of word processing terms such as "edit" or "format." And all these items would have to be adapted for specific industries, applications and languages.

While it sounds wonderful, this concept is still in the early developmental stage, dealing with a thus far difficult-to-measure cognitive discipline. Software ergonomics should be looked at as an extension of behavioral and organizational psychology rather than an extension of human factors.

It is extremely difficult to measure and quantify thinking that is based upon cultural, business and personal differences. It is axiomatic to state that no two people are exactly alike; this observation is especially true of the way people think.

Standards, however, are based on measured performance, capable of being repeated under differing conditions. Standards creation and implementation requires that there be no ambiguity in concepts or text.

At this time, software ergonomics can claim neither. Software ergonomics will come of age in the next 10 years and will make the computer a more beneficial tool.

SOFTWARE ergonomics is largely a cognitive discipline — it anticipates the way people think.

But before software ergonomics can accomplish this goal, it must define the task for the tool and define all aspects of the person who will do the task with that tool. If it does not have the discipline necessary to do these tasks first, software ergonomics will ultimately fail.

Currently, the Computer and Business Equipment Manufacturers Association is the only major U.S. group working to counter premature standardization in software. More voices are urgently needed.

Unless the entire industry becomes involved in the software ergonomics effort, companies will be rewriting their software under the most confusing of circumstances.

We cannot merely object down the road when an international standard is formally proposed. We must participate now. Failure to do so will mean following the standards makers into software disaster.

Cargill is a standards consultant at Digital Equipment Corp.

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SOFT TALK

William Inmon

Data bases come of age

It is interesting to compare the computer industry with other industries. The computer industry is, after all, new compared with most other major industries. That it is immature is not a disparaging remark — the immaturity of the industry is merely a statement of its age, which is a mere quarter of a century or so.

Contrast the age of the computer industry with those of other industries, such as construction (remember roads that could get you to Rome from wherever?) or accounting (remember the hieroglyphics no the walls of the tombs of the Egyptian pharaohs?). The worlds of software and data base management systems in particular are still in their formative stages.

Compare the data base industry with the automotive industry. In 1910, the automobile marketplace was dominated by a very few models — Model T Fords, for example. The Model T, in 1910, was a general-purpose vehicle. It served to carry chickens to market, the family

Continued on page 30

IBM burrows into CICS niche

Competitors see monitor software as potentially serious threat

BY ROSEMARY HAMILTON
CW STAFF

Nearly two years after its introduction, IBM's much-improved CICS performance monitor software has yet to pose a serious threat to the independent suppliers of CICS performance monitor tools.

But observers as well as these independent vendors agree that the IBM offering is just the beginning of what could be very tough competition in the future.

"We still don't come up against them as a major competitor," said Patrick McGettigan, president of Landmark Systems Corp. in Springfield, Va. "But they've made major upgrades to their product. This may be a small niche, but they are coming after it."

IBM's CICS Performance Analysis Reporting System (PARS) for MVS was first introduced in late 1985 and became available in March 1986. Since then, it has received additional enhancements from IBM, the latest of which came in May. CICS PARS/MVS is for CICS Release 1.7 and carries a monthly license fee of $900.

The product represents a big boost in performance, as well as price, over the older performance monitor offerings, a fact observers said indicates that IBM has big plans for this product.

"Transaction processing is a hot-button area now, and CICS is the main gun here. I would expect [IBM] to become more aggressive," said Herb Gepner, a senior associate editor at Datapro Research Corp. in Delran, N.J. "CICS PARS may be inferior [to the independent vendors' products] now, but that's just like many other IBM products.

Continued on page 30

Data View

Unix shipments by size class

Unix is still predominantly used on mid-range processors or smaller machines

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

SOFTWARE NOTES

CPA group goes on-line

The New York State Society of Certified Public Accountants, the Texas Society of CPAs and Price Waterhouse have jointly developed an information management system to run a statewide CPA association, including managing data on membership, mailings, continuing education and event management. The system uses the relational data base in the IBM System/38 operating system. Although the developers were 2,000 miles apart, Margaret Gray, director of administration for the N.Y. group, said such a joint effort was possible when

Continued on page 27

Firm offers parallel software

BY CHARLES BABCOCK
CW STAFF

BEAVERTON, Ore. — Producers of parallel processor computers have complained there is no software designed for their machines, but now a small Bedford, Mass., firm is offering one of the first commercial applications for large-scale parallel processors.

Two-year-old Nektonics, Inc. has developed a $20,000 to $90,000 fluid dynamics and heat-transfer simulation package for Intel Scientific Computers' IPSC-VX, a parallel processor employing Intel's hypercube architecture, in which each node is a processor, according to Nektonics spokesman Brian McCay. Intel Scientific Computers is a Beaverton business unit of Intel Corp., based in Santa Clara, Calif.

In addition, the simulation

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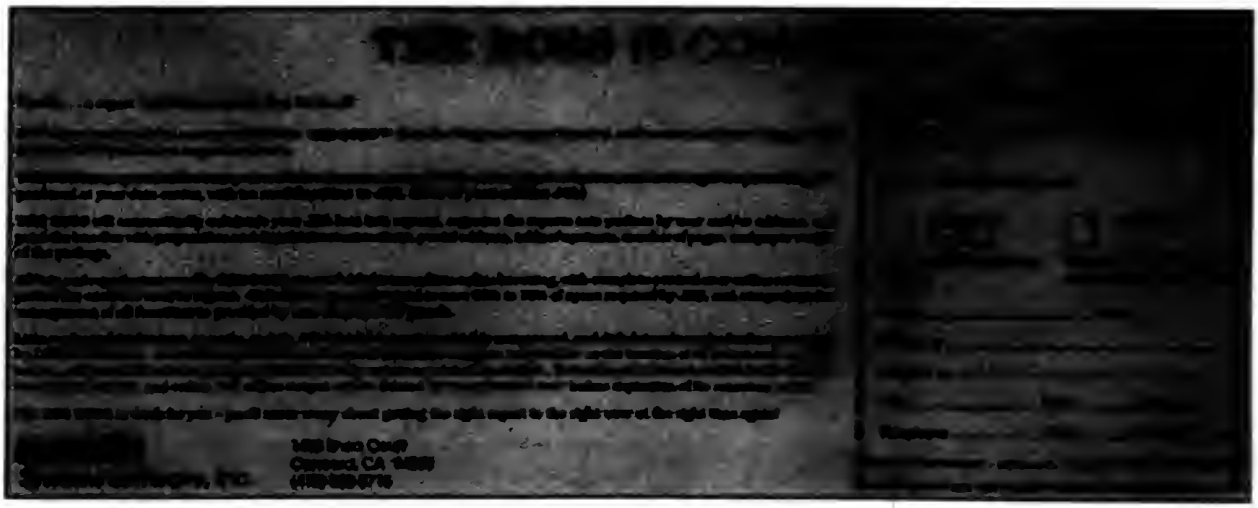
Inside



Theos system brings power to 386 machines

BY STEPHEN JONES
CW STAFF

WALNUT CREEK, Calif. — Theos Software Corp. recently announced a mainframe-style 32-bit operating system that is said to allow up to 128 users to tap into the power of one microcomputer running on Intel Corp.'s 80386 microprocessor.

The $799 multiuser multitasking program can physically address up to 4G bytes of memory with a virtual memory space of up to 64 terabytes in the protected mode. I/O redirection and command pipes make Theos 386 compatible with DOS and Unix operating systems.

Theos 386 is scheduled for commercial release in January 1988. OEM porting will be available in September, while application porting will be ready in November, company officials said.

The vendor also announced Theos C, a $599 companion C compiler that meets the forthcoming ANSI C standard and features Unix and DOS source code compatibility.

A full development kit — consisting of Theos C, Theos Basic and a Script text processor — will be available for $1,599, the vendor said.

Theos has an installed base of about 70,000 licensed copies of its operating systems, including software that runs on 8- and 16-bit computers, company officials said.

For migrating downward

Theos 386 is aimed at users who want to move from mainframes and minicomputers to less costly microcomputers. Theos Chairman Timothy Williams said he believes users may start migrating downward as powerful 386-based micros blur the line between large- and small-system performance.

Like earlier Theos operating systems for the Intel 80286 chip, Theos 386 uses much of the programming and many of the same command names found in mainframe and minicomputer environments.

Mainframe-like features include a user interface similar to the one on the IBM VM/CMS, the Exec job-control language, a full-screen editor and sophisticated index files.

Paul Cubbage, a senior industry analyst with Dataquest, Inc., agreed that the product would appeal to minicomputer users looking for improved price/performance, but he said conservative mainframe users would be unlikely to downgrade to a micro.

Because Theos 386 was designed to act primarily as a user-friendly operating system for multiuser business systems, Cubbage said the package could be an alternative to Unix.

Knowledge Craft components to be sold separately

PITTSBURGH — The Carnegie Group, Inc. recently announced its plans to sell the components of its artificial intelligence environment, Knowledge Craft, individually.

The seven modules have prices starting at $7,800. A complete system starts at $23,200.

Knowledge Craft is based on the Carnegie Representation Language. The product includes an inference engine, the Prolog language and a Carnegie-developed language called Ops as well as other supporting modules.

Meets customers' needs

"We've received a lot of pressure from customers to provide this," said James Ferguson, the Carnegie Group's product manager for knowledge-based tools.

According to Ferguson, individuals generally use the entire Knowledge Craft environment the initial development work. "Then, as they go on, they usually determine one or two areas they want to concentrate on," he said. "They want just those pieces."

Knowledge Craft is available on Digital Equipment Corp. and Sun Microsystems, Inc. hardware.

It is also available on two dedicated artificial intelligence systems — Symbolics, Inc. systems and the Explorer from Texas Instruments, Inc.

Individualized pricing

The complete Knowledge Craft for Sun workstations and Microvax IIs is $23,200, while the starting price of components is $7,800. The DEC VAX 8000 series is priced at $39,000 for the full system and begins at $19,500 for individual modules.

The cost on both the Symbolics and the TI systems starts at $12,500 for separate modules. A complete system costs $37,100.

The price of the complete Knowledge Craft package is about 15% less than the cost of all modules if purchased separately, according to Ferguson.

On the Sun workstation, for instance, Ferguson said the seven modules purchased separately would cost a total of $27,300.

Notes

CONTINUED FROM PAGE 25

minor differences between the two organizations are ignored. "Tightly control the design, and once 95% agreement is obtained, go with it," she said.

Sterling Software, Inc. and **Tangram Systems Corp.** are working together on a storage management system for personal computers that would use mainframe storage devices.

In the first phase of the joint effort, Tangram will reportedly integrate a modified version of Sterling's Intelligent-Backup, which is a PC storage management system, with Arbiter, its micro-to-mainframe package.

Southwest Software in Arlington, Texas, has changed its name to that of its parent company, **Altai Software, Inc.** Altai is best known for Zeke, an automated job scheduler for IBM mainframes. Altai's business has become more national, making the Southwest name "not as appropriate as it once was," said James P. Williams, president of the software firm.

The **American Association of Computer Consultants** has been formed to provide a directory of members' areas of specialty, sponsor conferences and take complaints from the public, said managing director Jonathan Wallick. Officers and board members are to be elected by the membership. Students may join for a $35 annual fee; the annual fee for other members is $100.

Wang Laboratories, Inc. has signed an agreement with **Panaophic Systems, Inc.** to market the Panvalet source code control system on Wang VS minicomputers. The Wang version reportedly will be called Panvalet VS.

Westinghouse Electric Corp. in Pittsburgh recently purchased a minority interest in **C&K Software Ltd.**, a maker of systems software for IBM mainframes. Westinghouse has remarketed a number of C&K products, which were designed for IBM's MVS and VSE operating systems, for the past three years. VM versions of a network control interface and a multiple sessions manager are now under development, a Westinghouse spokesman added.

IBM struck a deal with **Molecular Design Ltd.** in San Leandro, Calif., to jointly develop a system to manage chemical information. The software is intended for users of IBM 370 hardware in the chemical process and pharmaceutical industries.

A DB2 and SQL/DS newsletter is now available from the **DB2 and SQL/DS Users Bulletin** in New York. Interested users can send a self-addressed, stamped envelope to the organization at P.O. Box 560, Wall St., New York, N.Y. 10005.

Parallel

CONTINUED FROM PAGE 25

package will run on a supercomputer from Cray Research, Inc. in Minneapolis; an FPS-164 or FPS-264 parallel processor from Floating Point Systems, Inc. in Beaverton; and an X1-CP from Convex Computer Corp. in Richardson, Texas, McCay said.

Problem solver

The simulation package can be used to solve a variety of complex two- and three-dimensional fluid dynamics and heat-transfer problems.

It was designed for use in the aerospace, automotive, electronics, energy and materials and process industries, the Nektonics spokesman said.

Nekton 2.0 has been released by Nektonics for the Intel IPSC-VX/2 parallel processor, available in configurations that range from 16 to 128 processing nodes. Each node consists of an Intel 80386 microprocessor.

Simulations that require four hours to run on the Digital Equipment Corp. VAX 8600 can be run in three minutes on IPSC-VX consisting of 32 nodes, Intel spokesmen claimed.

Several other commercial parallel processing software packages are slated for delivery, including extruded materials modeling and molecular modeling, Intel spokesmen said.

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At last count, over 80 books, magazines and technical journals have been written exclusively about dBASE products. All designed to help you take maximum advantage of their capability.

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dBASE III PLUS

the data management standard

Data bases

CONTINUED FROM PAGE 25

to church on Sundays, the salesman from one town to the next and so forth.

Look at the automotive industry today. There is a wide variety of forms of personal transportation — motorcycles, trucks, sedans and Ferraris are but a few. The industry has branched out and created a product for the many niches in the marketplace. A general-purpose Model T in today's marketplace would simply be an anachronism.

Contrast the automotive marketplace with the data base marketplace. In the early dawn of the data base market — around 1960 or so — what did you have? The pioneers that attracted attention in the marketplace were Cincom's Total, IBM's IMS and SAS Institute's System 2000. If you were doing anything on data bases at all, you were using one of these products because that was all there was. At the same time, these were general-purpose products that served whatever data base needs arose. These data base products may be considered the Model Ts of the industry.

Age of specialization

But look at the data base marketplace today. What you find is a wide variety of specialized products — Ashton-Tate's Dbase II for microprocessors, Information Builders' Focus for end users, ACP for transaction processing and so forth. Predictably, the data base market has reacted just as the automotive marketplace has, by rewarding the specialists. Clearly, the world is staunchly turning toward the specialized data base package.

The result is the storage of data in many forms in many data bases. A by-product of the specialization that has occurred is the prolific redundancy of data. In short order, the specialization of the data base marketplace has mandated that the dual data base approach is the wave of the future.

But there is some curious thinking that can be found in both the marketplace and academia. Many of the mainstream vendors in the market doggedly cling to the notion that a single DBMS will serve all needs. These companies are trying to extend the Model T to serve the needs of hauling hay to market, impressing your date on Saturday night and taking the family on a vacation. The result is a monstrous polyglot that is neither glamorous, efficient nor capable of hauling large loads.

Dual data bases, redundancy of data and specialization rather that generalization are reality, and there doesn't appear to be any turning back. The vendors that firmly entrench their products in concepts rooted in the 1960s are doomed to creating and proliferating museum pieces.

Inmon is a senior principal with American Management Systems in Lakewood, Colo., and an author on the subject of data base design.

IBM burrows

CONTINUED FROM PAGE 25

They start out that way, and then IBM ends up making it better."

The CICS PARS offering is considered by observers to be the first serious CICS performance monitor from IBM.

Prior to CICS PARS, IBM offered a series of tools with a batch orientation. Some of those tools were rolled into CICS at no extra charge. Others, like Performance Analyzer II, were offered as separate products.

Others filling the gap

Before IBM offered a true performance monitor, a number of vendors stepped in to provide systems with real-time capabilities and more advanced analysis tools. Candle Corp. rolled out Omegamon/CICS in 1981 and now claims to have 3,000 users.

Other software vendors, such as Applied Data Research, Inc., added a CICS option to their performance monitor product line.

Landmark Systems introduced The Monitor for CICS in 1984 and now boasts a user base of 2,200. Newer entrants include Boole & Babbage, Inc., which acquired a CICS monitor product from Quantum International Corp. in Birmingham, Ala., in 1985 and began shipping a modified version of that product called CICS/Manager in late 1986. It claims to have sold 400 licenses.

Goal Systems International, Inc. in Columbus, Ohio, got off to a rocky start in the mid-1980s that "took the wrong approach to monitoring CICS," according to Jeffrey Barnard, a product manager at Goal. The vendor revamped the product and rolled out Explore/CICS Release 3 last year. It has since built up a user base of 175, Barnard said.

Observers said these vendors continue to enjoy a performance advantage over IBM. But they also said they expect IBM to continue boosting CICS PARS/MVS's functionality. In addition, the fact that it comes from IBM, the creator of CICS, carries considerable weight, according to users.

One CICS installation, which is a long-time user of IBM's CMF, is in the process of reviewing a new performance monitor, and it has already ruled out IBM's offering.

"I don't believe CICS PARS is as good as the others," said Ted Keller, manager of systems programming at Yellow Freight System, Inc. in Overland Park, Kan. "It just isn't in the same ballpark."

NEW PRODUCTS

Systems software

Syncsort, Inc. has enhanced its **Syback** backup/restore product and its **Syncsort CMS** sort/merge product.

Release 2.1 of Syback provides support for IBM's VM/XA in an IBM 370-mode machine. Other features include a scheduler service machine that enables the automation of all backup operations, automatic job checkpoint restart in the event of a system crash and improved task- and job-tracking capabilities.

Syncsort CMS Release 6.1 incorporates new sort algorithms and a faster copy function, the vendor said. It supports interactive prompting for copy-and-compare applications and for sort-and-merge applications.

A three-year license for Release 2.1 of Syback costs $4,125 per year. A three-year license for Release 6.1 of Syncsort CMS costs $3,500 per year.

Syncsort, 50 Tyce Blvd., Woodcliff Lake, N.J. 07675.

Applications packages

Sigma Design, Inc. has released an updated version of its Unix-based computer-aided design (CAD) software for building design, at the same time changing the system's name from CAD Solutions to **Arris**.

Arris Release 5.5 includes an object-oriented user interface and a space planning application called Space Design. Other enhancements include the ability to produce production drawings and create models and renderings, metric support and support for IBM's Enhanced Graphics Adapter-compatible graphics cards.

Arris is priced from $3,000.

Sigma Design, 61 Inverness Drive E., Englewood, Colo. 80112.

Utilities

A series of software products designed to connect non-IBM graphics peripheral devices to IBM mainframes has been announced by **Maersk Data, Inc.**

MD-Connection includes MD-Plot, which makes it possible to output Graphical Data Display Manager (GDDM)-produced charts on non-IBM plotters; MD-Laser for graphics on laser printers; MD-Slide, which links film recorders to IBM mainframes; and MD-Graftext, which mixes graphics and text on laser printed output.

MD-Connection supports all GDDM versions under IBM's MVS/TSO. Prices range from $7,500 to $13,500.

Maersk Data, 25 Vreeland Road, Florham Park, N.J. 07932.

An upgrade to the cross-referencing facilities in Version 1.4.B of its **Magec** application development system has been announced by **Magec Software.**

Users can now obtain hard-copy reports of all references and usage of data elements by batch or on-line applications developed or maintained through Magec. The reports are formatted to accommodate on-line viewing directly from the print queue.

According to the vendor, the usage report can show reference from the nonprocedural specifications and from Cobol customization coding done by the developers.

Magec operates on IBM mainframes under DOS and MVS. It costs $32,000 for DOS and $72,000 for MVS.

Magec Software, 2324 Seedling Lane, Dallas, Texas 75252.

Services

A review service, which the vendor said helps determine the true cost of information systems projects before resources are committed, has been introduced by **Duncan Associates.**

The **On Target Estimate** (OTE) basic review includes a written report that rates the project on more than 40 reliability factors. The Expert review includes customized recommendations for improvements. Comprehensive reviews include a fully documented, independently prepared project plan and an estimate.

Basic reviews start at $695, Expert reviews start at $1,895, and Comprehensive reviews are custom priced.

Duncan Associates, 5 Kitson Park Drive, Lexington, Mass. 02173.

Development tools

A kit said to allow application programmers to develop multitasking applications based on Digital Equipment Corp.'s VAX/VMS system services has been announced by **Wendin, Inc.**

The **Wendin-DOS Application Developer's Kit**, released in conjunction with Wendin-DOS, is said to allow system services to be called from high-level languages. Suppport for assembly language programmers is also provided.

New programs can access disks in physical, logical or virtual coordinates. Programs can open up to 128 files at once, access up to 4G-byte disk partitions, use files up to 4G bytes and use 16M bytes of extended memory. File locking is built-in.

The Wenin-DOS Application Developer's Kit costs $99.

Wendin, Box 3888, Spokane, Wash., 99220.

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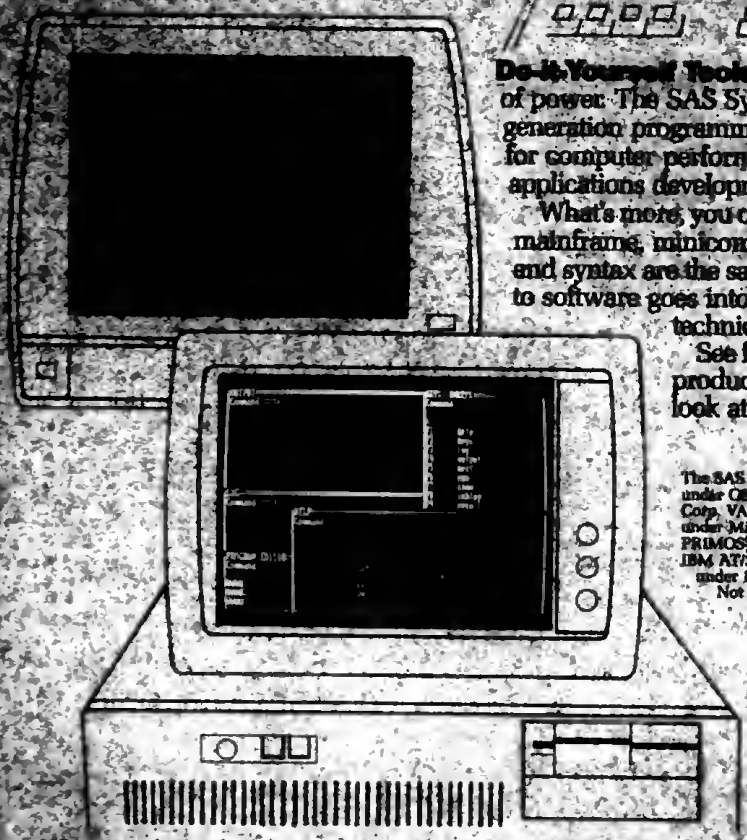

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SMALL TALK

William Zachmann

Programming by the book

In an era of exciting new computer software, it is interesting to note that some of the best software-oriented products aren't computer software at all. I'm referring to a batch of books that have recently been published as a result of an agreement between Borland International and Osborne/McGraw-Hill, Inc.

Judging by the four books in the Borland-Osborne/McGraw-Hill Programming Series, authored by Herbert Schildt, this joint publishing venture will prove to be a great resource for corporate developers interested in learning how to build serious applications on microprocessor-based systems.

Directed primarily toward Borland's Pascal, Prolog and C language products, Schildt's books offer first-rate material of more general applicability as well.

The titles are *Using Turbo C, Advanced Turbo C, Advanced Turbo Prolog Version 1.1* and *Advanced Turbo Pascal.* The first is a beginner's introduction to the C language, priced

Continued on page 36

Claris set to leave Apple nest

Apple subsidiary concentrates on software as it strives for independence

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Claris Corp., Apple Computer, Inc.'s software subsidiary, will take its first step toward severing ties to its parent when it moves into its own building in Mountain View, Calif., this fall.

While the move from Apple headquarters could be viewed as merely a symbolic gesture, Claris and Apple executives maintain that it is part of a three-part plan to eventually spin off the subsidiary.

John Zeisler, Claris marketing vice-president, said Claris, which he jokingly refers to as [Claris President Bill] Campbell Land's Apple-Rejected, Inspired Software — is in phase one. "We're a start-up in reverse," Zeisler explained. "We started with revenue, and now we're building an organization."

Claris' management team is now in place and includes former Metaphor Computer Systems, Inc. cofounder Yogan Dalal, recently named Claris vice-president of product development. Dalal was a member of the Xerox Corp. Palo Alto Research Center team that included Apple fellow Alan Kay and Apple Vice-President Larry Tesler.

Zeisler said Apple software — Macdraw, Macpaint, Macwrite, Macproject, Appleworks and Access II — is currently being repackaged with the Claris label and is scheduled to be on dealers' shelves by year's end. Those five products account for about $40 million in annual revenue.

A priority at Claris will be to improve support services for those six packages, something Apple has "notoriously avoided," according to Zeisler.

A large part of Zeisler's time is spent on the phone, talking to software developers eager to pitch their packages to Claris.

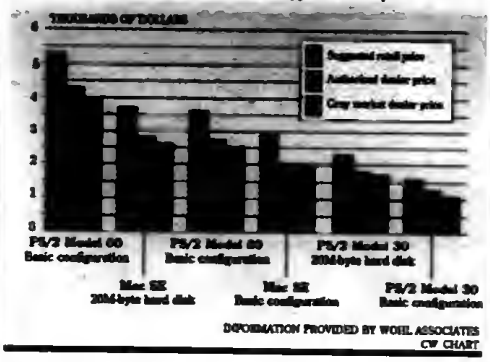
Continued on page 41

Inside

Data View

Dealer discounts

Current retail IBM PS/2 and Apple Mac SE prices



INFORMATION PROVIDED BY WOHL ASSOCIATES
CW CHART

New president eyes cure for Micropro market ills

Leon Williams

Micropro International Corp. was in a tailspin when Leon Williams took over as president a year ago. The San Rafael, Calif.-based vendor's technology had grown dusty after years of neglect, and its once-intimidating share of the word processor marketplace had been lost to a number of younger, more innovative companies.

Although the company is far from regaining the glory of its heyday, Micropro is showing signs of recovery. Armed with $23 million in cash, Micropro is chasing acquisition targets that might bolster current products or spark the company's entry into Apple Computer, Inc.'s Macintosh marketplace.

To cozy up to its large installed base, Micropro is set to release a spate of products by year's end. The first will be a $495 enhanced version of Wordstar 2000 Plus, scheduled for release in October.

The firm is also reaping profits from a recent Wordstar Professional upgrade, the first in years, based on the acquisition of a product from Newstar, Inc. late last year. Williams recently spoke with *Computerworld* West Coast correspondent Stephen Jones about Micropro's strategy.

Why did Micropro become so disconnected from its huge installed base?

Two reasons. Number one, early on in the company, good records on customers either were not

Continued on page 42

The monitor
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By the book

FROM PAGE 33

at $19.95. The other three offer more advanced treatment of C, Prolog and Pascal, at $22.95 each.

Schildt is an author who clearly knows what he is talking about.

Using Turbo C is a beginner's introduction to the C language — obviously Schildt's favorite. Providing numerous practical examples, the book is as much an introduction to basic programming concepts as it is to the C language generally and to Borland's Turbo C in particular.

The book is written in three parts. The first is an introduction to C as implemented in Borland's Turbo C.

Starting with some background on the C language, Schildt goes on to describe the Turbo C environment and editor.

Part one concludes with an introduction to the fundamentals of Turbo C.

The second part is a straightforward cumulative presentation of the Turbo C language starting with variables, constants, operators, expressions through program control statements, arrays and strings, pointers, functions and I/O.

The book's final section covers more advanced topics like user-defined data types, preprocessor and compiler options and library functions.

The presentations are accompanied by example code illustrating the point being discussed.

The reader can try out these examples, with variations, to his own satisfaction.

Shows his stuff

It is with *Advanced Turbo C*, however, that Schildt hits his stride. More than just a follow up to the more introductory material in the basic book, *Advanced Turbo C* provides what amounts to a comprehensive computer science course as well as an advanced C programming guide.

The first two chapters, for example, thoroughly develop the basics of searching and sorting algorithms and queues, linked lists and binary trees.

Dynamic memory allocation, graphics programming, statistics, codes and data compression, random-number generators and simulation and expression parsing and evaluation are among the topics covered in other chapters.

Advanced Turbo Pascal is organized around an outline similar to that found in *Advanced Turbo C*. It differs primarily in that the examples given are for Turbo Pascal rather than for Turbo C.

In addition, it contains chapters specific to the Turbo Pascal Data Base Toolbox and Turbo Pascal Graphics Toolbox. These are libraries of subroutines sold by Borland as accessory products to Turbo Pascal.

Advanced Turbo Prolog, however, is quite a different book, reflecting the unique capabilities and applications potential of the Prolog language.

A key language for artificial intelligence applications, Prolog is treated by Schildt under topic headings for which it is well suited, including expert systems, natural language processing, vision and pattern recognition, robotics and machine learning.

'Real' applications

One of the best opportunities for corporate users of personal computers during the next few years will he their employment for serious "real" applications.

Programming languages like C, Pascal and Prolog are much better tools for capitalizing on these opportunities than traditional languages like Fortran and Cobol.

Books like these, combined with language tools like Borland's, make it easy for information systems professionals to learn how to use the newer tools more effectively and take advantage of the opportunities PCs offer.

They can also help more experienced PC users who lack a professional systems background grow into more capable and sophisticated users.

Zachmann is vice-president of research at International Data Corp.

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Economics spur facsimile board sales

BY JAMES A. MARTIN
CW STAFF

With the shrinking of facsimile transmission technology onto a microcomputer add-in card, a hot new micro communications market has emerged.

In 1986, the facsimile board's first full year on the market, fewer than 1,000 units were sold, according to International Data Corp. (IDC). So far this year, about 10,000 units have been sold, a figure that is expected to double by the end of the year and triple in 1988.

The facsimile board enables an IBM Personal Computer or compatible to directly transmit or receive images of text and graphics with the immediacy of a facsimile machine, while at the same time cutting communications costs and offering ease of use.

Currently, a dozen or so smaller office automation and image processing companies are fighting it out for market share, including Datacopy Corp., Dest Corp. and Gammalink. Meanwhile, more broad-based vendors, including Intel Corp., Apple Computer, Inc. and IBM, are rumored to be preparing products to compete in this market, while Next, Inc. will reportedly feature a built-in facsimile board in its upcoming workstation products.

The various facsimile boards now on the market have only a few things in common, other than the obvious ability to turn a microcomputer into a facsimile machine. Many currently available machines combine Rockwell International Corp.'s R96 facsimile chip set with a modem compatible with the CCITT Group III facsimile standard on one board.

Some boards, such as Gammalink's Gammafax Plus, also offer a Hayes Microcomputer Products, Inc.-compatible 1,200 bit/sec. modem, usually on a daughterboard, to ease the need for another expansion slot. Hayes-compatible modems are not capable of directly interfacing with facsimile machines or other facsimile boards, so a facsimile modem is required, according to H. S. Magnuski, president of Palo Alto, Calif.-based Gammalink.

Several boards, including Datacopy's Microfax, have an Intel 8088-2 or another on-board microprocessor to relieve the CPU of Send-Receive tasks. Others rely instead on scaled-down boards and the accompanying software to largely off-load the CPU tasks.

Making a difference

The software driver for these boards is "where a vendor can make a difference," according to Shelly Bakst, a senior analyst with IDC. "It's up to these vendors to make the necessary software links between the facsimile application and the standard micro software packages, such as Lotus's 1-2-3 or Wordperfect."

The differences in the products, however, are merely vendor trademarks and will not pose compatibility problems between the various vendor facsimile boards and machines, analysts say.

Economics is the chief factor behind the growth of this new technology. Priced between $900 and $1,500, facsimile boards are less expensive than the majority of $2,500 to $4,000 facsimile machines and offer the same capabilities.

Also, facsimile boards can enable a large corporation to cut down on the use of overnight mail services. With lower costs, a department in a corporation can have five or six facsimile machines, in essence, instead of the usual one per department as is common today.

If it takes off as expected, the facsimile board should hurt sales in the traditional facsimile market while boosting revenues in microcomputer peripheral industries. Modem and data storage vendors stand to gain, as the technology requires modems for sending and receiving and hard disks for storing the memory-hungry facsimile image files. Analysts say they expect users to print facsimile transmissions on laser printers for such applications as desktop publishing or computer-aided design and manufacturing (CAD/CAM).

Despite the technology's promise, the facsimile board technology has its limitations and drawbacks. Some analysts say it will not gain wide acceptance beyond certain niche markets like desktop publishing and CAD/CAM.

"In applications such as those, there is a need for merging text and graphics together in a time-vital situation," says Julie Weiss, an analyst at Dataquest, Inc. in San Jose, Calif. But when text or graphics requires large amounts of memory, or if any further significant processing is needed by the receiver, modems and other traditional data communications methods will continue to be preferred, she added.

"I don't think the current crop of products out there totally meets the end user's needs," Gammalink's Magnuski says.

Still, facsimile boards have come a long way since Gammalink introduced what is considered the first entry, for some $2,000, in November 1985.

In the future, facsimile modems will be emerging for IBM's Personal System/2 series with the Micro Channel architecture. Several other vendors, including Apple, are expected to unveil models for the Macintosh line and costs are expected to drop to $500.

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Delta Computer enters IBM-compatible area

MANSFIELD, Mass. — Clone maker Delta Computer Corp. recently announced a line of IBM-compatible personal computers consisting of the Intel Corp. 8088-1-based Elite, the 80286-based Prestige and the 80386-based Premier.

Shipments will begin this month, according to James Patterson, vice-president of sales and marketing.

All three computers use 5¼-in. floppy disk drives. "The 5¼-in. drive is still a standard," Patterson said.

"Not all software is available in 3½-in. yet," he said, adding that Delta will continue to follow industry standards. The units are manufactured to Delta's designs in Taiwan.

The Elite comes with two 360K-byte 5¼-in. drives, 256K bytes of random-access memory (RAM) expandable to 768K bytes on the motherboard.

The Elite will sell for $1,195; a 20M-byte hard disk and color configurations will also be available.

The Prestige comes with 512K bytes of RAM expandable to 1M byte on the motherboard and one 5¼-in. 1.2M-byte drive. The unit has six expansion slots, four 16-bit and two eight-bit.

The Prestige, being marketed as a file server in network applications or as a high-speed workstation, will sell for $1,995 and is also available with a 20M- or 40M-byte hard disk and color monitor.

The 80386-based Premier includes 1M byte of memory on the motherboard, expandable to 16M bytes, the company said. It includes eight expansion slots, one 32-bit, five 16-bit and two eight-bit. It comes with a high-resolution enhanced graphics adapter color monitor. It lists for $4,995, including a 40M-byte hard disk.

Claris

CONTINUED FROM PAGE 33

He said these discussions with developers have ranged from sharing marketing resources and file formats to various development activities.

However, Zeisler said it is unlikely that Claris will enter into any sort of joint agreement soon. He is reticent to offer any specifics regarding Claris's plans for either company or product acquisitions.

"That's a really phase two," he said. "Acquisitions are important in terms of the time-to-market issues, but I don't have any timetable to make it happen."

The final phase will be the marketing of Claris-developed products, something that Zeisler does not expect will occur for at least 18 months, coinciding with the tentative goal for Claris' spin-off.

Claris has received an undisclosed amount of funding from Apple, but its 30 employees also own a stake in the subsidiary. Apple officials would not disclose their percentage of ownership vs. that of the Claris staff. To spin off, Claris officials will consider a number of options, including an initial public offering and venture capital funding.

Independence is key to Claris's future success, both Apple and Claris officials have stressed. It will allow Apple to participate in the applications software market without alienating its third-party developers, they maintain.

"Apple was previously competing with its third-party developers but with the advantage of the Apple label," Zeisler said. "With Claris, we'll remove the Apple label, and we'll operate independently.

"Third parties recognize that the Apple logo was a marketing advantage and that removing that logo is a step in the right direction," Zeisler added.

Apple missing from logo

As proof of its intentions, Claris recently unveiled its own logo, which is strikingly different from the multicolored Apple. The Claris label sports elegant white characters on a background of royal blue. An apple is significantly absent.

However, that may not be enough to quell the fears of third-party software developers. In an August issue of Esther Dyson's "Release 1.0," Microsoft Corp. President Bill Gates expressed strong reservations. "Through Claris, they have a group of executives whose compensation depends on screwing us," Gates reportedly told Dyson.

Zeisler dismissed Gates' alleged remarks. "Third-party relationships should be reciprocal," he said, noting Microsoft's MS OS/2 efforts. "Apple should be aware that some of their developers have established dual loyalties. Should Microsoft be annoyed? That's up to Microsoft."

Valerie Houtchens, group product manager for Microsoft's Macintosh applications division, said Microsoft's ambivalence toward Claris is "close to being gone away.

"From the beginning, we've always been interested in having them remain a hardware vendor and leave software to the third-party community," Houtchens conceded. "At least their stated intention is that Claris will operate independently."

Ironically, it was Rob Campbell, former president of Forethought, Inc. — a recent Microsoft acquisition — and now a senior consultant to Microsoft, who first proposed the idea that Apple establish a separate software subsidiary. Campbell made his first pitch in 1980, one year after he joined Apple as applications software marketing manager. At that time, Apple had combined its software and hardware business units, a move that Campbell opposed.

"The problem when you combine software with hardware is you carry all the overhead of hardware, but you compete with a salesperson's attention — obviously hardware is the bigger sale for them and will get most of their energy," Campbell explained.

Despite Campbell's entreaties, the proposal was nixed. "They didn't understand the business," Campbell said. "They had too much on their plate at that time."

About a year ago, the project was revived.

Although as a Microsoft staffer Campbell may find himself in an adversarial position with his former employer, he is nonetheless a Claris advocate.

"It clarifies the roles of Apple," he maintained. "Now, if you're talking to Apple, you're talking to hardware people. When you're talking to Claris, you're talking to a potential competitor and a potential publisher for your software.

"Anyone worth their salt isn't afraid of competition," he added.

Campbell said he is confident that Apple and Claris will move quickly toward separation.

Micropro

CONTINUED FROM PAGE 33

available or were not kept as the business was growing.

The second reason is that the company had not updated the main product, Wordstar Professional, for four years, and that had caused a lack of contact with the installed base.

Why did Micropro hit such hard times during the last few years?
Micropro's early success laid the seeds for some of its problems.

As other companies began to target single products on single machines and Micropro had a plethora of products on a plethora of machines, it was very difficult for the company to make the transition from that very old installed base into the modern era.

Micropro had competitors come in that were only working on second-generation customers.

What kind of changes have you made in the last year?
The first thing that we did was to start a vigorous product acquisition and licensing program. We kicked that program off with the acquisition of the Newstar product line.

We've also worked very diligently to rebuild our basic products, and we will be launching those products in the next several months.

Can you be more specific about some of the new products?
We are starting to ship our CP/M Release 4.0 now. We have a major upgrade to Wordstar 2000 Plus, which will be out in October.

That is a significant offering for us . . . we have dramatically improved the performance of the product in addition to its internal capabilities.

For instance, we've added in-line graphics, full-page preview, significantly enhanced laser printer support and several expansion modules that will provide the capability for creating desktop presentations and will enable the user to easily communicate back and forth with all the other word processors in the marketplace.

Is Micropro going to continue to be a one-product company, or are we going to see more diversification?
You're going to see more diversification, but we're not going to go off into wild areas for us, such as things like [Borland International's] Sidekick or language compilers or data base management packages.

We're going to focus on the area that we define as personal communications processing, which means anything that allows individuals in their private and business lives to communicate their thoughts to each other. We're no longer just a word processing company.

How do you plan to get into the Macintosh market?
We are actively pursuing an entry into that market.

We have looked at several acquisition opportunities; we don't have anything to report yet, but we're definitely working on it.

> "YOU'RE GOING to see more diversification, but we're not going to go off into wild areas for us. . . . We're no longer just a word processing company."
>
> LEON WILLIAMS
> MICROPRO INTERNATIONAL CORP.

With Wordstar and Wordstar 2000 becoming so similar, do you plan to follow many users' requests and merge the products?
Yes. Our long-term plan is to have one product that you can take home and install it with the classic Wordstar command set or install it with the mnemonic Wordstar 2000 command set. We are not discontinuing either product.

How does Micropro plan to win back some of the market share that it has lost?
The company has a strong image, but it has not had a strong image in the area of service, and that's something we're going to correct in a major way.

So if you say that the brand is perceived very positively, and you correct the service and come out with new products, I think we have a guaranteed winner.

And once we are able to reconnect to our installed base in large numbers and get them upgraded and on our modern product — and it will take us a couple of years to do that — I think Micropro will become extremely powerful in the marketplace. And my competition knows that, too.

How can Micropro leverage its installed base to boost sales and move the company toward recovery?
The installed base automatically generates a pull for the product.

Our challenge is to reconnect to that installed base; to let them know that we're here and that we've got new products for them. The installed base is our biggest asset.

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Further confirmation of Digital's leadership in terminals and systems networking comes from the latest IDC report, "With 55% of shipments in 1987 and 45% of the installed base, Digital is and will continue to be the dominant factor." For a more competitive approach to your local area networking, write: Digital Equipment Corporation, 200 Baker Ave., West Concord, MA 01742. Or call your local sales office.

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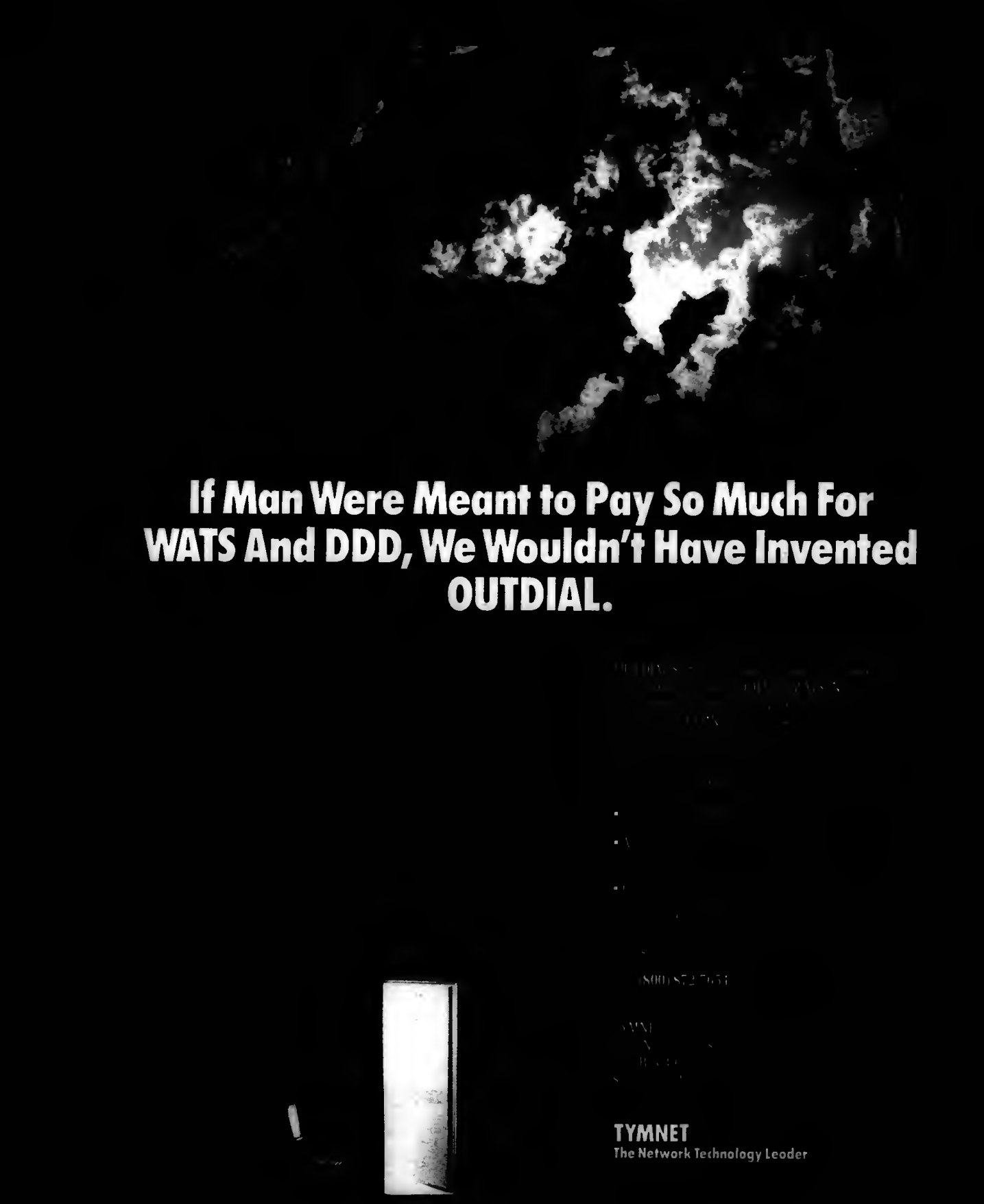

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NEW PRODUCTS

Software applications packages

The Accounts Payable System, a software application for use on Microsoft Corp. MS-DOS- or IBM PC-DOS-based computers, has been introduced by **Software Technology, Inc.**

The Accounts Payable System tracks invoices to be paid, monitors a firm's cash requirements and available discounts, ages invoices and generates a vendor analysis showing month-to-date, year-to-date and total-to-date information. The system provides for computer-generated checks from up to nine separate checking accounts.

The software integrates with the vendor's TABS III Time Accounting and Billing System.

The Accounts Payable System costs $500. A multiuser version for up to nine terminals costs $700.

Software Technology, Suite 120, 620 N. 48th St., Lincoln, Neb. 68504.

A full-function circuit board design package designed to run on IBM Personal Computers equipped with an IBM Enhanced Graphics Adapter (EGA) board has been announced by **Aptos Systems.**

Criterion II provides printed-circuit board design. It incorporates libraries of components and edits large designs. Users can enter new devices or new modules of a design as library parts. Library parts can also be created for existing parts or from scratch without the need to exit a design.

Each data base can have nine libraries, and each library can contain 600 entities.

Criterion II costs $1,500.

Aptos Systems, Suite 200, 10 Victor Square, Scotts Valley, Calif. 95066.

A mail- and name-management system called **Mailbox**, which is said to allow users of Lotus Development Corp.'s Symphony to set up and maintain company and individual names, titles, addresses and phone numbers, has been announced by **Front Row Systems.**

Mailbox prints personalized letters, envelopes and mailing labels. It produces eight different reports including name and address lists, index cards and up to three different personalized letters.

The system has a capacity for about 1,000 names on a PC configured with 640K bytes of memory, the vendor said. Front Row Systems recommends a minimum of 512K bytes. The program runs on IBM PCs, PC XTs, ATs and compatibles, according to the vendor.

Version 1.1 or higher of Lotus's Symphony is required.

Mailbox costs $89. Additional copies on the same order cost $40.

Front Row, P.O. Box 550346, Suite 44, 3158 Maple Drive, Atlanta, Ga. 30355.

Development tools

An entry-level microcomputer program development tool preconfigured for use with IBM Personal Computer XTs, ATs and compatibles has been announced by **Step Engineering, Inc.**

The **Microstep Development Station** consists of one AT or XT plug-in card and Microstep Debug/Control software. The Microstep system supports writable-control-store (WCS) memory with a 128-bit by 4K-byte WCS memory array.

The interface to the user's system is accomplished through read-only memory, programmable read-only memory and random-access memory simulation techniques, the vendor said.

The Microstep Development Station costs $3,695.

Step Engineering, 661 E. Arques Ave., Sunnyvale, Calif. 94086.

Software enhancements

An enhanced version of the **OCR Plus** optical character recognition software package has been

Continued on page 48

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announced by **Datacopy Corp.**

OCR Plus Version 2.0 reads proportionally spaced text and titles ranging in size from 10 to 18 points. Pretrained proportional type styles include bold, Modern, Madeline, Cubic and Triad. A pretrained title type style has been included so that Courier text from 10 to 18 points in size may be read.

Eight word processing programs are supported by Version 2.0. Text can be formatted automatically as it is read or can be done in batch mode after a document file has been created.

OCR Plus Version 2.0 costs $695. It runs on IBM Personal Computers and compatibles.

Datacopy, 1215 Terra Bella Ave., Mountain View, Calif. 94043.

Data storage

The **Macdisk** family of external mass-storage systems for the Apple Computer, Inc. Macintosh Plus, Macintosh SE and Macintosh II has been announced by **Priam Corp.'s Systems Division.**

The Macdisk family consists of a Winchester disk drive with preformatted capacities of 40M, 65M, 100M or 230M bytes, interface cable, driver, utility software and manuals. The drive plugs directly into the Macintosh small computer systems interface (SCSI) port. A second SCSI port allows other printers to daisy chain from the Macdisk. Average seek times are said to be up to 20 msec.

The Macdisk costs $1,895 for the 40M-byte EM40; $2,295 for the EM65; $2,695 for the EM100; and $3,995 for the EM230.

Priam, 20 W. Montague Expwy., San Jose, Calif. 95134.

Tape backup systems said to store 64M bytes of data on a DC 2000 ¼-in. tape minicartridge have been introduced by **Irwin Magnetic Systems, Inc.**

The systems are available in both internal models and external subsystems. The internal **Model 265** is a half-height 3½-in. product designed for the IBM Personal System/2 line. The vendor said it slides into one of the floppy-disk slots in the microcomputer's cabinet. It is also available in a 5¼-in. version.

The external **Model 465** subsystem offers plug-in portability for use with multiple microcomputers in the same office. Both versions offer data-transfer rates of 500K or 750K bit/sec.

The Model 265 is priced at $995. The Model 465 is priced at $1,095.

Irwin Magnetic, 2101 Commonwealth Blvd., Ann Arbor, Mich. 48105.

Printers/Plotters/ Peripherals

An enhanced model of the **Twinriter 6** said to perform typeset letter-quality, high-density graphics and high-speed data processing printing has been announced by **Brother International Corp.**

The Twinriter 6 can mix text

Brother's *Twinriter 6*

and graphics in one document and produce text documents at a rate of one to five pages per minute and high-speed data processing at 200 char./sec. It combines a 36 char./sec. daisywheel printhead with 200 char./sec. dot matrix printhead in the same printer. It automatically selects the correct printhead based on the user's need.

Available with optional RS-232C serial interfaces, the Twinriter 6 is priced from $1,395.

Brother International, 8 Corporate Place, Piscataway, N.J. 08854.

Board-level devices

Data Translation, Inc. has announced the **DT2853 Frame Grabber** and the **DT-Iris** subroutine library.

The DT2853 Frame Grabber is said to incorporate built-in real-time processing with standard Grab, Store and Display Image functions on the IBM Personal Computer AT.

The DT-Iris subroutine library provides software support for the real-time capabilities of the DT2853 Frame Grabber.

The DT2853 Frame Grabber costs $1,595. The DT-Iris software costs $695.

Data Translation, 100 Locke Drive, Marlboro, Mass. 01752.

The **PM3011**, a caching disk controller for the IBM Personal Computer AT, XT-286 and compatibles said to support ST506/412 drives or enhanced small device interface drives, has been announced by **Distributed Processing Technology.**

The controller utilizes a Motorola, Inc. 68000 microprocessor and transfers data simultaneously between the disk drive, cache memory and the host computer.

The PM3011 is priced from $600.

Distributed Processing Technology, P.O. Box 1864, 132 Candace Drive, Maitland, Fla. 32751.

A color graphics adapter capable of providing 2,048- by 2,048-pixel virtual-screen resolution and 1,280- by 1,024-pixel display resolution has been announced by **QDP Computer Systems, Inc.**

The adapter, called the **Viva 2000**, allows users to pan around an entire drawing in the 2K- by 2K-byte frame buffer in real time. The board is also said to feature hardware windowing. The window can be dynamically resized, relocated, hidden or retrieved.

The Viva 2000 costs from $2,200.

QDP Computer Systems, 23632 Mercantile Road, Beachwood, Ohio 44122.

NETWORKING

DATA STREAM

Elisabeth Horwitt

Telecom also means data

"Telecommunications" is an overused word that has been assigned too many meanings to mean much anymore. Is telecommunications just voice, or does it include data? Does it refer to just those telephone-related communications products, like T1 lines and private branch exchanges, that may also carry data? How about local-area networks?

This same confusion extends to the telecommunications manager's job. At some companies, the title still refers to the nitty-gritty of wiring, telephone sets and trying to keep up with the latest carrier tariffs. At an increasing number of Fortune 500 companies, telecom managers are equal partners with MIS, and regular information exchanges take place. The two organizations' territories overlap, with telecom managers' jurisdiction extending all the way up to the mainframe channel in some cases.

This kind of setup seems not only desirable but necessary for the growing number of companies that use telecommunications equipment and services to distribute data and applications to remote sites and workstations. In too many companies, MIS and telecom are adversaries locked in a perpetual power

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Rivals burying the hatchet?

Microsoft, Novell downplay feud over LAN Manager; joint project eyed

BY PATRICIA KEEFE
CW STAFF

ANALYSIS

The winds seem to be shifting over Provo, Utah, and Redmond, Wash., the respective homes of network software vendor Novell, Inc. and micro software giant Microsoft Corp. Could a reconciliation be in the offing between the two?

Earlier this year, Microsoft and 3Com Corp. announced plans to co-develop the LAN Manager, which is being promoted as the standard for distributed processing in the work group environment. As a result, Microsoft is thought by many to be on a collision course with Novell and its distributed processing platform, Netware.

Novell has provoked Microsoft's ire by refusing to license Microsoft's LAN Manager protocol suite, just as it earlier declined to license any part of the LAN Manager's predecessor, Microsoft Networks. In turn, Novell has accused 3Com and Microsoft of fabricating the myth that Novell cannot or will not support the LAN Manager. But such bickering may soon be a thing of the past.

The once-strained relationship appears to be improving, as both Novell and Microsoft have softened their rhetoric about each other in recent interviews. One possibility, according to sources close to both companies, is that the two will shortly reach a formal agreement to work cooperatively, although probably not on the LAN Manager.

Referring to Craig Burton, Novell's vice-president of corporate marketing and development, one Novell source said, "I know Craig feels there is a way to work this out so that they can collaborate. If Craig says he's going to do something, he almost

Continued on page 54

Airlines lead telecom budget hikes

Telecom budget expenditures: 1987 budget vs. 1986 expenses

Airlines' communications spending will take a big leap this year; steel and utilities will dip

Industry	Percentage of increase or decrease[1]
Airlines (3)[2]	26.15
Trucking (4)	14.46
Financial (nonbanking) (20)	10.60
Beverages (2)	8.80
Automotive (2)	8.70
Banks and banking holding companies (11)	7.84
Manufacturing (4)	5.36
Oil services and supply (3)	2.80
Steel (2)	(9.06)
Utilities (3)	(9.41)

[1]Decreases are in parentheses
[2]Number of companies responding to survey

INFORMATION PROVIDED BY INTERNATIONAL COMMUNICATIONS ASSOCIATION
CW CHART

BY ELISABETH HORWITT
CW STAFF

Telecommunications department budgets increased an average of 5.96% from 1986 to this year, with airlines' increases far outpacing those of other industries, according to the annual International Communications Association's (ICA) Expense Survey, published recently. Airline telecommunications departments plan to spend an average of 26.15% more this year than last, the survey found.

The next highest increase, 14.46%, was budgeted by the trucking industry, while steel and utilities' networking expenditures are scheduled to drop by more than 9% this year (see chart at left), the national user organization reported.

The 131 ICA members who responded to the survey provided information about "past and planned outlays in data commu-

Continued on page 54

Vendor aids Netview hookups

BY ELISABETH HORWITT
CW STAFF

SAN JOSE, Calif. — Determined to hasten the industry's faltering progress toward a multivendor network management system, Communications Solutions, Inc. recently formed a business group intended to help telecommunications vendors and users hook up to host-based diagnostic and control applications under IBM's Netview umbrella.

"We see Netview as a great beginning, just as SNA was in 1976," said Thomas Polizzi, a Communications Solutions vice-president who will head the 14-member group. Currently, he said, telecom vendors can write interfaces to IBM's Netview/PC product that allow them to send alerts to Netview — but do not allow for Netview applications to perform diagnostics and testing across various vendors' equipment. "We don't want to preannounce products," Polizzi said, "but we will help non-IBM vendors interface with Netview/PC and, in conjunction with IBM, help users and vendors develop software that will consolidate what commands should be present" in Netview-based network management applications.

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Inside

PC-host link uses LU6.2, VTAM

BY PATRICIA KEEFE
CW STAFF

CAREY, N.C. — Tangram Systems Corp. recently introduced Arbiter Peer Services, a VTAM subsystem said to allow interprogram communications between host-attached personal computers and environments that support IBM's Advanced Program-to-Program Communications or LU6.2.

Users can develop and use LU6.2 applications and run the subsystem with any number of IBM 3270-compatible cards.

The subsystem can even be used asynchronously, regardless of the IBM Systems Network Architecture (SNA) networks in use, said Art Ingram, vice-president of marketing and sales at Tangram.

Uses VTAM subsystem

Arbiter Peer Services takes advantage of the core communications part of Arbiter, a VTAM subsystem for file transfer and remote virtual-disk applications between PCs and mainframes that was unveiled last September, adding additional capabilities.

Using Peer Services/PC, a PC-based component application program written in Cobol, Pascal, C or assembler reportedly can communicate with programs implemented under CICS, IBM's System/34, 36 or 38, Digital Equipment Corp.'s VAX family, IBM's Token-Ring network and other LU6.2 environments.

Also supported are a variety of host connections, including asynchronous, coaxial and IBM Synchronous Data Link Control (SDLC) links. A variety of high-level languages and connection protocols are also supported.

Peer processes

PCs can communicate with peer processes using standard conversation verbs like ALLOCATE, CONFIRM, RECIEVE AND WAIT and SEND, whether linked to the host by LU2 emulation adapters — such as products from Digital Communications Associates, Inc., IBM, CXI, Inc. or Integrated Network Systems, Inc. — linked asynchronously or by modems using any protocol converter, Tangram said.

Arbiter Peer Services provides the protocol switch between the requester PC connection and its peer LU6.2 server. It enables tasks to be segregated between the server and the requester according to the strengths of each processing environment, as opposed to the limits of the host connections, the vendor added.

Binary data and messages flow between peer processes anywhere in an SNA network with Peer Services, Tangram claimed. This means that PC-to-host applications that use techniques such as the "hide the IBM 3270 screen, find and fill in the fields using keystroke simulation, then press Enter if the X clock is off," techniques are no longer necessary, the vendor added.

Arbiter Peer Services uses an interprogram system communication (ISC) link to CICS where parallel, reusable sessions reduce the host system overhead allowing hundreds of PCs to be connected by a single CICS ISC link.

With Peer Services, Tangram said it is now possible for a PC application to allocate a CICS transaction, write or read a user-selected temporary storage file and optionally define it.

Options available

Arbiter Peer Services is available immediately, with first-year license fees ranging from $18,750 to $39,000. It requires Arbiter Release 1.4.0, which also includes two new options: The Arbiter Script Language (TASL) and a Third Party Program Interface with QMF.

TASL reportedly enables readers to automate repetitive PC and host tasks. TASL is like a "superbat" processor through which tasks such as asynchronous dial-up to Arbiter or its Interactive Session Relay-based host session sign-ons can be

automated, the vendor said. It ranges in price from $1,700 to $3,500 for a first-year license.

The Third Party Interface is said to transfer data extracted from IBM's DB2 from a QMF export file to a remote-dial file and converts it to CSV , BSV, IBM's DIF or WKS. This utility can execute under IBM's TSO or batch and ranges in price from $2,500 to $4,900 for a first-year license.

Telecom

FROM PAGE 49

struggle. MIS sees telecom as a narrow-minded profession stressing technical elegance above functionality and cost considerations above everything else — to the detriment of corporate strategic goals and user needs. Telecom managers, for their part, often complain that MIS comes up with high-flown applications that cannot be met by the existing cabling and leased-line facilities.

Often, when the smoke has cleared, a significant number of telecom techies have left the company, and MIS is indisputably on top. MIS oversees 69% of the telecom departments that responded to a recent International Communications Association survey.

This is not surprising: MIS departments begin with a lot of centralized power and are closer than telecom techies to the financial and administrative executives who make corporate strategy. As corporations merge data and voice networking facilities, traditional telecom people often end up as permanent subordinates who provide bandwidth at MIS's behest. Or they end up out of a job.

The savvy ones transcend their existing jobs' telephone maintenance orientation by acquiring the skills and knowledge to deal with LANs, IBM's SNA and other host-based communications products.

And they do their companies a lot of good, marrying to MIS concerns their hard-won telecom expertise — for instance, how to deal with a recalcitrant divested Bell operating company or cost trade-offs of installing new wiring for a high-speed network.

They can also provide a different perspective to MIS managers who tend to view their world through Big Blue eyeshades. This tendency had little effect on telecom realms while IBM stuck to computers, but now the vendor is making a major push into the networking field and using its leverage with MIS to influence corporate buying decisions on PBXs, modems and T1 switches.

According to one consultant, MIS managers, given a choice between IBM subsidiary Rolm Corp.'s central branch exchange and another vendor's PBX with more features, will choose the IBM label. An activist telecom manager can guard against this IBM myopia.

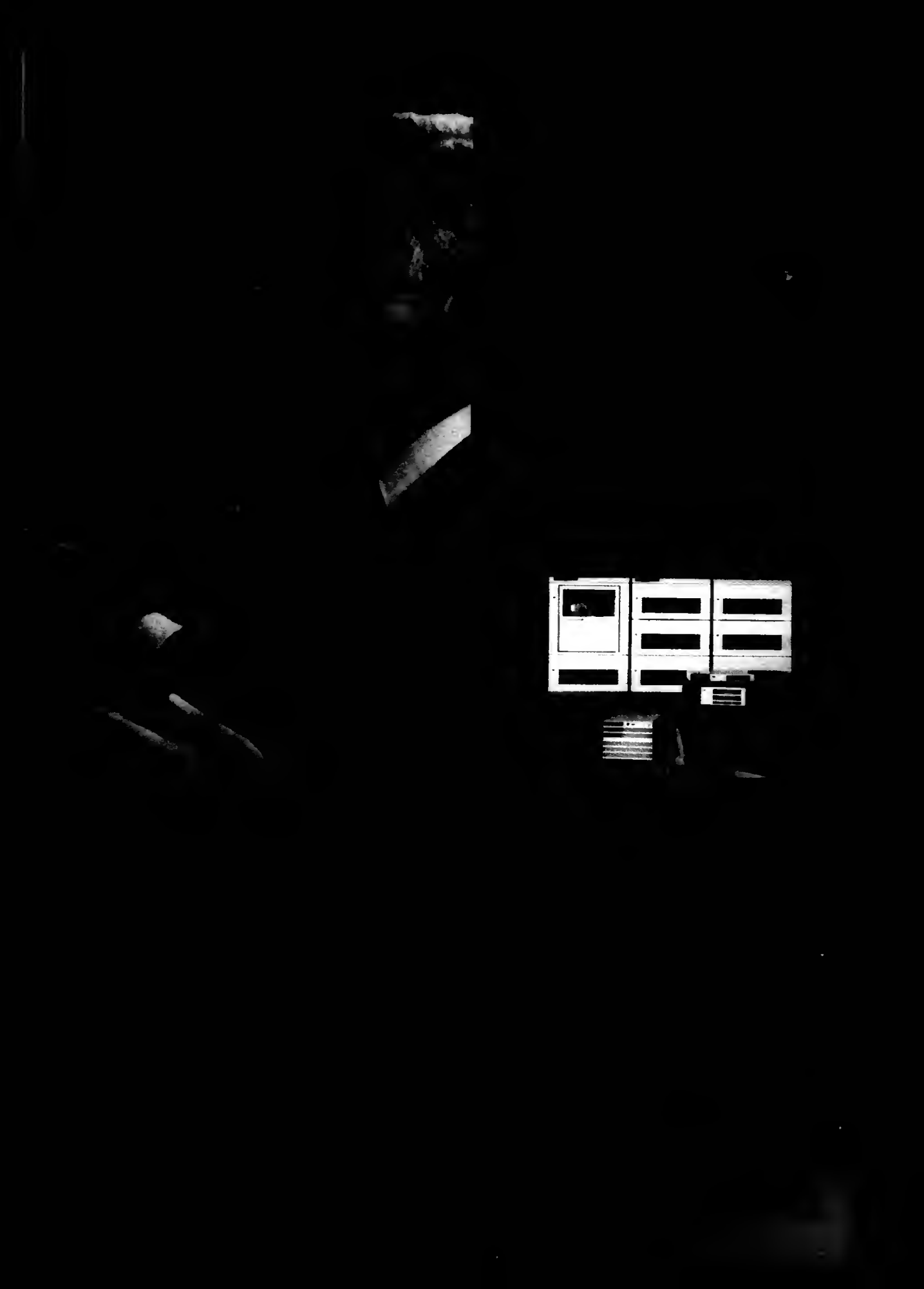
Lobbying

The other key role telecom managers can play in the corporate environment is that of industry activists. Several telecom users groups are vigorously conveying their members' needs and negative comments to vendors and regulatory bodies.

According to communications attorney Victor Toth, users groups are still too small and fragmented in terms of their goals to convey to the networking industry a coherent set of demands for cost-effective, flexible, diverse, universally available telecommunications services.

But there is hope for the future if telecom departments gain both the knowledge and the clout to become true advocates for their companies' communications goals.

Horwitt is a *Computerworld* senior editor, networking.



Rivals

FROM PAGE 49

always does."

In a July interview, Burton insisted, "I don't see why we have to license the LAN Manager." In a more recent interview at PC Expo, Burton reiterated his feelings toward the LAN Manager. "We can support OS/2 a lot better without the LAN Manager," he said, claiming that Novell's Netware network software provides more features today than are listed under the LAN Manager specifications, or "wish list," for delivery in 1988.

But Burton has also suggested that Microsoft salesmen, rather than company executives, are to blame for persistent reports suggesting that Novell will not be able to emulate the LAN Manager. And Microsoft says it has repeatedly offered to license the LAN Manager to Novell, all the while carefully emphasizing that its agreement with 3Com is not exclusive. Moreover, heavy traffic between the two companies during the last few weeks has not escaped the attention of industry observers.

The peacemaker

But it is not as if the two vendors are willing to kiss and make up on their own, according to sources close to both companies. They suggest the traditionally cool relationship between Novell and 3Com may be warming up, thanks to pressure from mutual mentor IBM.

IBM's alleged role as peacemaker would most likely be prompted by concern that Novell's Netware system remains compatible with IBM and Microsoft's OS/2, one source says. After all, a significant percentage of IBM's business networks are sold with Netware.

Also, Burton is reported to have met with William Lowe, the president of IBM's Entry Systems Division, to discuss concerns about the LAN Manager and other issues. Burton does not comment on Novell's relationship with IBM.

In its eagerness to market the LAN Manager to IBM for use in the latter's OS/2 Extended Edition, Microsoft may be only too happy to accommodate IBM by breaking bread with Novell.

IBM has not yet indicated its position on the LAN Manager.

As for Novell, analysts suggest that only pride could lead the ordinarily pragmatic company to spend considerable time and resources emulating the LAN Manager when it could more easily license and be done with it. Burton denies ego is the reason. He says the LAN Manager, pure and simple, is old, inferior technology.

Whatever the outcome, it appears that Novell and Microsoft will at least call a halt to the slings and arrows. "All Microsoft needs is for IBM to go its own way and have the LAN Manager be a dog, and Microsoft's glory days are over," ventures John McCarthy, research director at Forrester Research, Inc. in Cambridge, Mass.

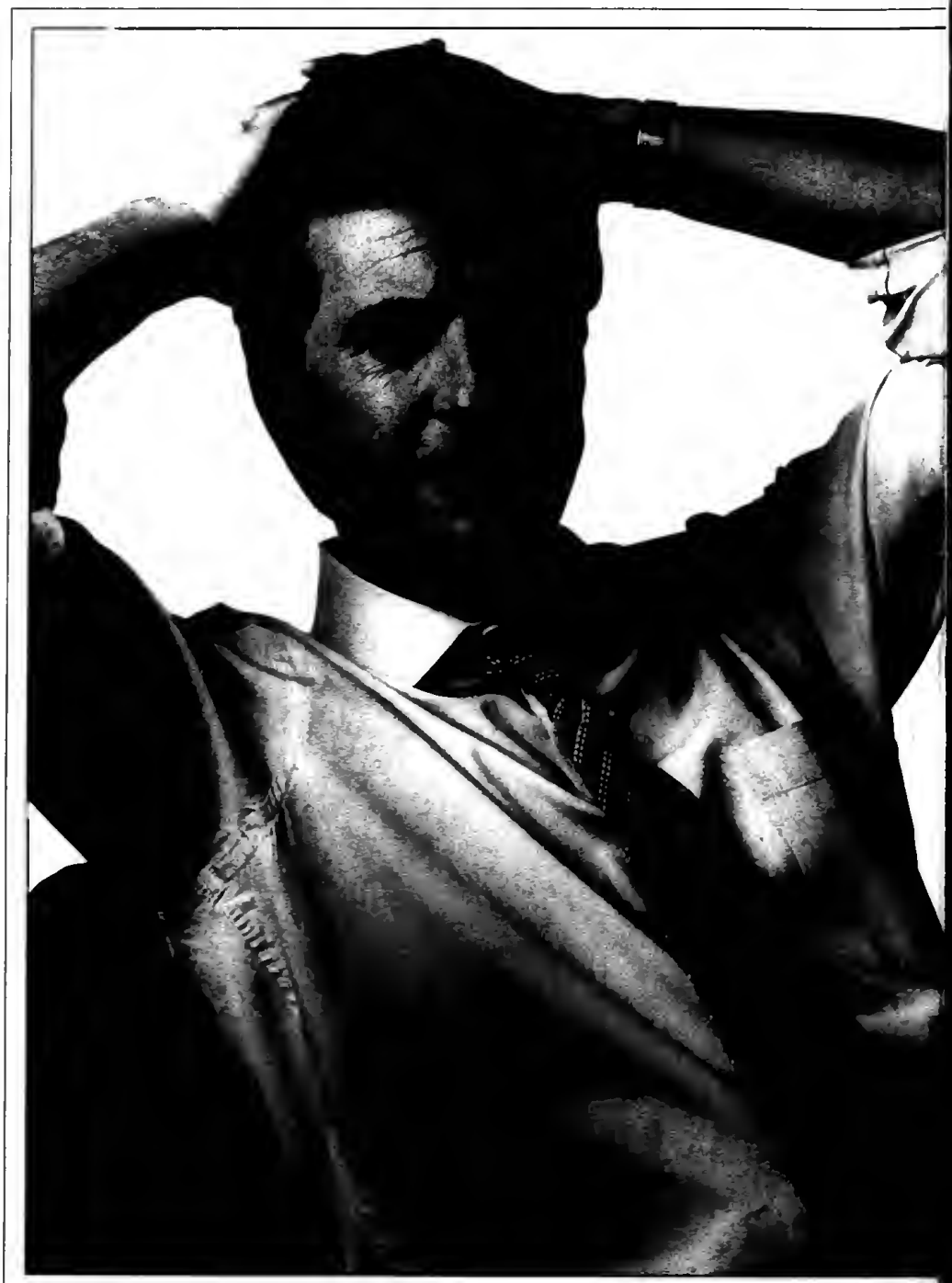
That is unlikely to happen, but it will be interesting to see what kind of relationship Novell and Microsoft can come up with and how it will impact 3Com.

Budget

FROM PAGE 49

nications, carrier expenses, telephone equipment, staff salary, possibly networks — everything that comes under the control of telecommunications departments," explained ICA spokesman Robert Eilers.

The types of equipment and services that came under telecommunications departments' jurisdictions varied from firm to firm, he added. ICA also surveyed responding companies' telecommunications budgets in 1986 as a percentage of total revenue. Office equipment and computer companies led other industries in this area, allocating 1.7% of their total revenue to telecommunications. Airlines were next, allocating 1.6%; railroads were third, allocating almost 1.3%. Utilities, personal care products, steel, textiles/apparel, natural resources, food processing, paper and forest products and beverages industries were at the bottom of the list, allocating less than 0.5% of their total 1986 revenue to telecommunications expenditures, the survey found.



Corvus enhances PC/NOS

SAN JOSE, Calif. — Corvus Systems, Inc. recently enhanced its network operating system, PC/NOS, adding support for IBM's Netbios as well as Microsoft Corp.'s MS-DOS 3.1 and 3.2.

Through a new utility called Netpoll, the operating system is compatible with multitasking applications, such as Microsoft's Windows and IBM's Topview, that can be run concurrently with PC/NOS, Corvus said.

The upgraded PC/NOS, Version 1.1, reportedly provides an assortment of spooler utilities that provide print queue management and possess the ability to spool files from any other system on the network for printing.

Version 1.1 also features a "purge" utility said to deinstall the operating system and clean up all PC/NOS files, leaving the system ready to be deconfigured for a new activity. This feature might be used when the computer station is going to be changed to a new location or operation and previous files and structures are not wanted, Corvus said.

Also new is the Netview utility, which Corvus claimed is a display of plugs and sockets through which users can connect to any resource on the network that is not security-protected by the system manager.

PC/NOS Version 1.1 costs $695, as did the initial version. Upgrades are available to current users at no charge.

Netview

FROM PAGE 49

The group is already talking to vendors about its services and attempting to gain user input as to what kinds of commands should be part of the Netview diagnostic and control system, Polizzi said. "Major network operators know what commands are needed to manage modems, muxes, and non-IBM terminals from a centralized point," he explained.

'Caesar's wife'

"But," Polizzi added, "someone is needed to write them down and pass them to IBM, the vendors and perhaps standards committees. We don't have a vested interest in any gear, so we can be Caesar's wife. And many T1 vendors aren't cognizant of the SNA culture, so we can also bring that to the table."

The Systems Network Architecture software company will announce several products to facilitate the process of Netview applications and interfaces, Polizzi said.

"It is unreasonable to expect a bit [Netview] application effort from vendors with limited resources and expertise," he added.

"Developing Netview applications is a big commitment for most communications shops," agreed Hal Clark, a senior product manager at Digital Communications Associates, Inc. (DCA).

"Telecom vendors don't have expertise in C-lists and applications programming," Clark continued. "I've talked to Polizzi, and it looks like Communications Solutions will be doing a lot of the work themselves to provide multivendor network management applications under Netview."

Communications Solutions will develop software that runs under Netview as host application programs and work with vendors to develop software to run on the telecom systems, Clark reported.

Talks with Communications Solutions are at too early a stage for DCA to reach any conclusion about how useful the software vendor's offerings will be, Polizzi said.

Communications Solutions has been having "cordial conversations with IBM" about its project, according to Polizzi.

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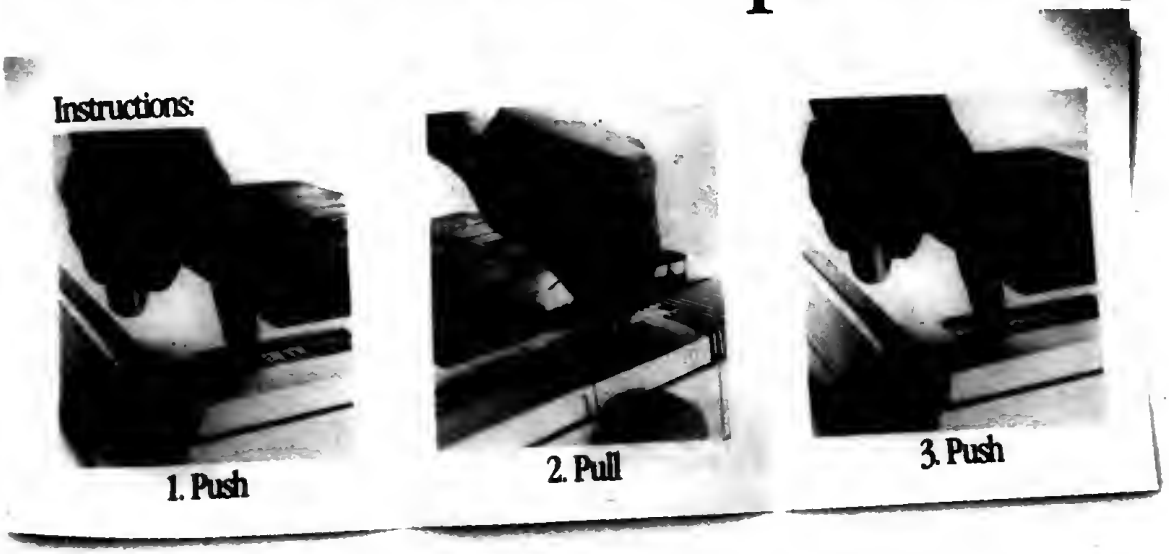

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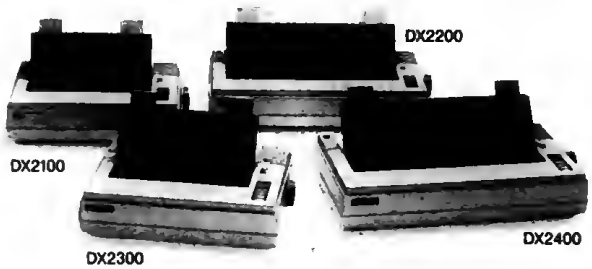

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- ☑ **IBM's Systems Applications Architecture** (SAA), which promised to address IBM's own compatibility problems. When and how will it be incorporated into products *and* the information systems environment?
- ☑ **PS/2 and OS/2:** Their current state (and problems) have been well documented, but what will they grow into—and has IBM truly responded to customer needs with this combination?
- ☑ **IBM's newly created Applications Systems Division,** which seeks to (among other goals) aid non-IBM software vendors as they develop applications. How far along is it, and what is the expected effect on the market?
- ☑ **The products released in the Year of the Customer:** How did they fare, and when will the next products become available? Which are in the distant future—and which don't have a future?

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An IDG Communications Publication

NEW PRODUCTS

Local-area network hardware

An intelligent broadband data network interface device has been introduced by **Phasecom International.**

The **Model 402** establishes a temporarily dedicated link similar to that provided by a data private-branch exchange, in which the circuit is dedicated during communication and is freed for other use when communication ends.

The Model 402 can be remotely operated from any point on the network. The interface device includes a modem that supports standard data rates up to 19.2K bit/sec. in synchronous or asynchronous modes. User-specified scrambling of synchronous data, as well as passwords for restricted access and operation, are provided for security.

The Model 402 costs $1,495.

Phasecom International, Suite 126, 30941 W. Agoura Road, Westlake Village, Calif. 91361.

Customer-premise equipment

Two products designed for sharing printers and plotters between computers or workstations or for intercomputer communications have been introduced by **Integrated Marketing Corp.** (IMC).

According to the vendor, the **Data Manager 4x4 and Data-Net 1551** are buffered with 256K bytes of random-access memory, field-expandable to 1M byte. Each operates at user-selectable speeds from 300 to 38.4K bit/sec.

The Data Manager 4x4 is an eight-port system with four RS-232 serial ports on the motherboard. The four extra boards may consist of additional serial ports. The Data-Net 1551 is a six-port RS-232 serial system.

The Data Manager 4x4 costs $795. The Data-Net 1551 costs $695.

IMC, 1031-H E. Duane Ave., Sunnyvale, Calif. 94086.

Links

A gateway said to allow up to 32 personal computers on a local-area network (LAN) to simultaneously conduct remote IBM 3270 sessions with an IBM mainframe has been announced by **Wall Data, Inc.**

The **Datagate/LAN** card fits into a PC slot. It features a microprocessor with 256K bytes of on-board memory and gateway software to emulate remote IBM 3174 and 3274 cluster controllers. It includes an individual remote diagnostics port and two concurrent direct-host links. The gateway PC is nondedicated and can be used as a standard LAN workstation.

Prices for the Datagate/LAN package start at $1,995 for 32 host sessions with one host link.

Wall Data, 17769 N.E. 78th Place, Redmond, Wash. 98052.

Electronic mail

A service that allows the exchange of electronic mail between users of most major U.S. systems and systems abroad has been introduced by **DA Systems, Inc.**

Dasnet currently links systems including AT&T's Mail, DA Systems' Dasnet E-Mail, MCI Communications Corp.'s MCI Mail and Telex. Dasnet can also link computers running the following software: Unix, Digital Equipment Corp.'s Vaxmail or On-Line Business Systems, Inc.'s Wylbur for the IBM 3080 series.

Cost to individual subscribers is $50 per month plus charges for intersystem mail. For system or site subscriptions, there is an implementation cost of between $459 and $6,000, plus usage and a monthly subscription fee.

DA Systems, 1503 E. Campbell Ave., Campbell, Calif. 95008.

Modems/Multiplexers

The **Model 535 Modem Sharing Unit,** designed for clustering multiple devices on a single line, has been announced by **Avanti Communications Corp.**

The Model 535 allows up to four terminals operating in a multipoint, polled network to share a single channel, the vendor said. It features CCITT V.35 interfaces.

Other features include a buffer option for tail-circuit applications, which compensates for timing differences between AT&T's Dataphone Digital Service or satellite networks and the individual Model 535 channel. The Model 535 Modem Sharing Unit is priced at $995.

Avanti, Aquidneck Industrial Park, Newport, R.I. 02840.

Cabling

A wall molding cover plate for through-the-wall computer cable installations has been introduced by **Midwest Innovations, Inc.**

The **Cable Outlet Plate** facilitates installation, use and removal of premanufactured cable as well as network wiring. The plate can be used with up to 10 cables at once. Installation is possible in about five minutes with a screwdriver and a utility knife, according to the vendor. Pre-existing installations can be accommodated by the removable gate plate.

The plate costs $9.95.

Midwest Innovations, Suite 1225, 2500 W. Higgins St., Hoffman Estates, Ill. 60195.

This dial modem comes with a feature you wouldn't expect for $445. Our reputation.

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

3380 defines disk standard

Not many companies or individuals in the computer industry can redefine a market. But why is it that the outfit that does it more than anyone is IBM?

On Sept. 2, IBM did it again, this time with the long-awaited third generation of 3380-class storage products — long-awaited as in the two years since IBM redefined the market with its second generation of 3380 disk drives and 3880 controllers.

Most of what IBM announced was expected. The 4.5M byte/sec. channel rate and triple-density disks were not surprises. The only question some people had about the features was whether IBM might go to 6M byte/sec. There also might have been some surprise in IBM's move to allow existing 3880s to be upgraded to handle faster CPU-to-cache channels and allow all 3090 mainframes, not just the E models announced earlier this year, to support those channels.

The basic features should be easy enough for IBM's competition, the plug-compatible man-

Continued on page 66

IBM maps mid-range strategy

Execs commit to two-tiered approach, outline plans to expand 9370 line

BY JAMES CONNOLLY
CW STAFF

The strategy has been falling into place for 20 months. Now, it is time to execute the plans.

IBM is positioned to carry out the two-pronged mid-range strategy it developed in 1985. The company refocused its efforts, eliminated confusion in the user community and designed a product plan, according to two key executives who are charged with mid-range responsibilities and who spoke to *Computerworld* recently.

IBM's product plans include the introduction and delivery of the System/36 and 38 follow-on product, commonly known as Silverlake, during the second half of 1988 while also expanding the 9370 departmental systems line downward and then upward, said Stephen B. Schwartz, president of the System Products Division.

Charting the course

Schwartz and Larry J. Ford, IBM vice-president and assistant group executive for mid-range marketing, outlined the company's plans to steer general-purpose mid-range customers toward the lower part of the IBM 370 family — the 4381 and 9370 or the "3X" line, which includes the System/36 and 38 follow-on product.

"Our whole focus of the 9370 was aimed at our very large accounts who wanted to distribute 370 processing throughout their departments," Schwartz said.

He added that the important features of the 9370, in comparison with the earlier 4361, include the former machine's smaller size, ability to run in an office environment and the packaging of easier to use software, such as VM/IS.

Meanwhile, Schwartz denied that the two-tiered strategy was designed to counter the success of rival Digital Equipment Corp.

"They probably played some

Continued on page 63

Data View

Supercomputers

1986 vendor shares of world market

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Peripheral firms slide

LA JOLLA, Calif. — IBM plug-compatible manufacturers, or PCMs, are steadily losing market share in nearly all areas, according to a recent study by Computer Intelligence.

PCMs are gaining only in printer sales, losing ground in the direct-access storage device (DASD), tape drive, communications processor and terminal markets, the study showed.

Although the tape drive market has been its weakest, IBM has been showing steady progress there, thanks largely to its

Continued on page 66

Concurrent plans to add supers

HOLMDEL, N.J. — Concurrent Computer Corp., which now offers multiprocessor superminicomputers primarily for technical markets, recently set in motion a supercomputer development project.

Concurrent announced an agreement under which Princeton University will transfer to Concurrent the technology to build a commercial version of the Navier-Stokes fluid-dynamics computer. That system, developed under grants from the National Aeronautics and Space Administration, was demonstrated as a single-node computer in 1985 as part of research done at Princeton and the California Institute of Technology. Key researchers included Daniel N. Nosenchuck and Michael G. Littman of Princeton's department of mechanical and aerospace engineering.

Concurrent President James K. Sims said his company has begun an evaluation process to determine whether developing a supercomputer is feasible.

Inside

IBM

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The entry level Model 110 comes with 10 non-IBM emulations built in, and provides an 84-key keyboard with 12 definable function keys.

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Besides being designed for compatibility with other computers, IBM's new ASCII terminals are more compatible with people. New 14" flat screen displays provide a non-glare viewing surface and smooth scrolling. Our 310 and 410 models also offer a choice of 80 or 132 column displays, with crisp character resolution, in green or amber-gold.

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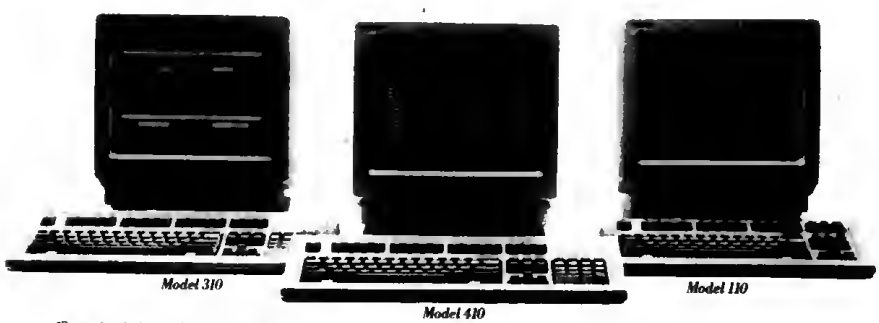

Model 310 *Model 410* *Model 110*

*Prices subject to change without notice.

IBM maps

FROM PAGE 61

role, but all competitors played a role. There are over 150 people making mid-range systems around the world. We take them all into consideration when we put a strategy and a plan in place," he said.

"I chuckle at times to read about how the 9370 was an answer to the VAX," Schwartz added, "The 9370 took four years from the time we started it until the time we shipped it, and at the time we started it, DEC wouldn't have been the one we would have been worried about. It was several of the Japanese computer manufacturers."

The System/36 and 38 lines are oriented more toward new accounts, Schwartz said. The System/36's strength is ease of use at the expense of 370 functionality. He added, "We will make 370 software easier and easier to use, but I do not believe we will make it as easy to use as the System/36."

Schwartz claimed the "System/3X" family, including the System/3, 32, 34, 36 and 38, will have an installed base of more than 300,000 processors by the end of the year. He also said the product line is key to attracting new customers, particularly those who are buying their first computers.

"There is a huge opportunity in the United States. Over the next five years, a million mid-range systems will be placed. Worldwide, there will be probably twice that number. The 3X product is awfully good where people use it as their data processing system," he said.

Answers questions

Schwartz, placed in charge of mid-range manufacturing and development in late 1985, said IBM "put a plan in place to make the strategy clear that we were supporting both the 3X and the 9370 as our general-purpose strategy. I think it is fairly well understood now. Whereas [at] this time last year there may have been some questions, I doubt if there are any questions today as to where we are going in the mid-range."

Ford said the strategy involves more than products. He said IBM wants all sales representatives focused on the mid-range, improved customer support and applications available through IBM and third parties. To keep the sales force focused on the mid-range, IBM added those products to sales representatives' quotas, Ford said.

In the applications area, IBM is strengthening relationships with applications providers such as value-added resellers and marketing assistance program participants, Ford noted.

Schwartz added that IBM's sales force and its customers understand there are two answers for general-purpose computing in the mid-range: that the long-term support and the areas in which IBM is spending money are the 370 and System/36 and 38 lines. According to Schwartz, the consolidation of IBM's product development efforts along two lines also means there are economies, particularly when systems such as Silverlake and the 9370 can use common peripherals and components.

"In the fall of 1985, we decided that we had to consolidate our development activities and put more focus on a couple of things that we could expend our resources on. We were spending a lot of money in development in too many different areas, and we needed to focus our development resources," Schwartz said.

Meanwhile, Ford and Schwartz said there should be no confusion about the roles of the two general-purpose product lines and IBM's special-purpose machines, which include the System/88 fault-tolerant computer, the Series/1 communications system and the RT Personal Computer Unix-based workstation.

Schwartz said, "The System/88 is for fault tolerance. That is a very narrow niche of computing. People who have a fault-tolerant requirement understand the role of the System/88. There is no confusion." IBM will offer special-purpose machines to respond to specific requirements, be added, claiming IBM will not "blindly" provide a single-product architecture.

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To know us is not to worry about us.

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MEMOREX

3380

FROM PAGE 61

ufacturers (PCM), to copy. But what might be tougher is the functionality that IBM is placing in the new 3990 controller.

The PCMs have a little more than a year to match that functionality, which includes writing to cache at electronic speeds and automatic copying of files to separate backup disk volumes.

The 3990 is not due for delivery until mid-1988, and PCM customers have come to expect at least a few months of delay after delivery before PCM versions of products arrive.

As with MVS/XA a few years ago and VM/XA SP this year, IBM is likely to again be hiding new functions in microcode, which is a move that makes the PCMs' cloning task that much tougher.

However, the PCMs are expected to survive, although a recent Computer Intelligence study showed that they are falling farther behind IBM in most peripherals markets, and IBM's pricing on its new products and the price cuts on the older 3380 family members might displease the PCMs' stockholders.

For users, there is good news. They might reap the benefits of a price war. They know for certain what IBM is going to do. They know what the triple-density drive looks like and what products support 4.5M byte/sec. channels. But of greater importance is that they know the answer to a question many have been asking, which is what role storage controllers will play in IBM's long-term plans. The answer, obviously, is that the 3990s will play a much greater role, probably freeing the host from many tasks.

But the answers raise new questions. One IBM customer wondered last week whether IBM's next step might be to use the 3990 as a controller for tapes as well as disks. And IBM leaves one to wonder whether the quadrupling of cache memory to 256M bytes is only a short-term step, with the company planning production of 4M-bit memory chips — four times as dense as the chips in the 3880 and 3990 — only months after the 3990 ships. One should remember that the 3880 was one of the first IBM products to be upgraded when 1M-bit chips arrived last year.

Connolly is *Computerworld's* senior editor, systems & peripherals.

Peripheral

FROM PAGE 61

popular 3480 tape cartridge device, with which PCM products have only recently begun to compete. Since 1985, IBM's market share has increased from 61% to 68%, the report said.

Currently, PCMs supply only 1% of IBM 3480 type drives, according to Computer Intelligence.

The study also showed a strong gain by IBM in the DASD market, from 75% to 83% from 1985 to this year, attributable to the success of the double-density 3380 drive. PCMs now have only 9% of this market, the report said, predicting that IBM should continue to add to its market share in both the DASD and tape drive markets. The survey was conducted before IBM's recent introduction of triple-density drives.

Storage Technology Corp. showed strength among tape drive manufacturers, with 23% of the installed base on IBM mainframes and a 50% share on PCM mainframes.

Storage Technology's success is a result of its strong performance in the IBM 3420 Model 8-compatible market, according to Computer Intelligence.

In the printer market, Storage Technology and Xerox Corp. have made inroads, according to Computer Intelligence.


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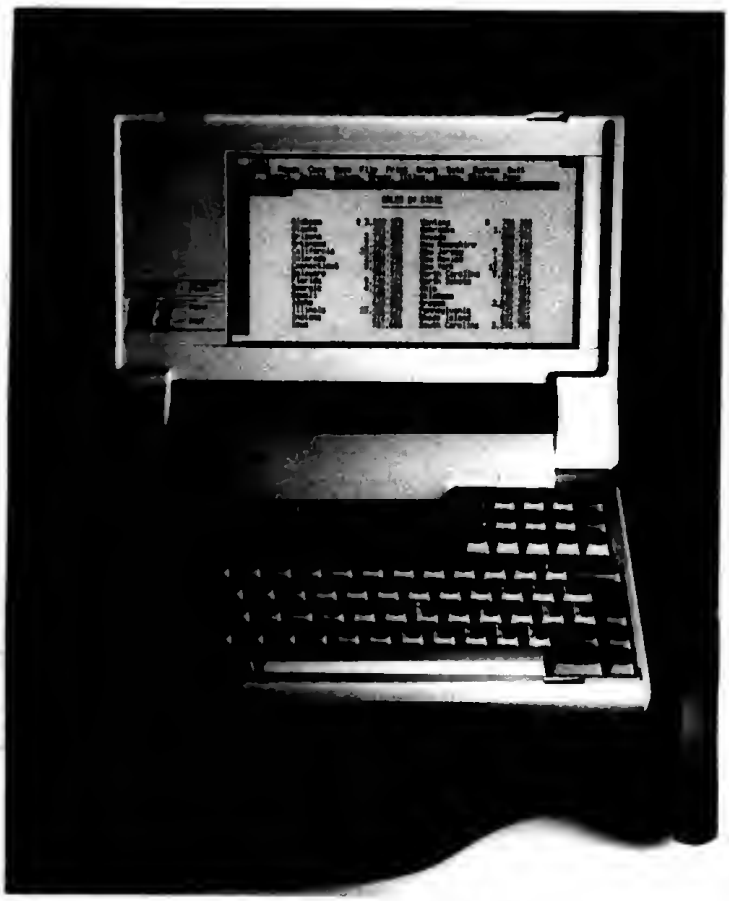

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If you already own a Multi and would like to upgrade your screen, or need technical information, call NEC Home Electronics (USA) Inc. at 1-800-NEC-SOFT.

You'll find your job a lot easier when you work with brighter characters.

C&C Computers and Communications

NEC

NEW PRODUCTS

Turnkey systems

A wide-measure laser image setter that merges type with line art and halftones has been introduced by **Compugraphic Corp.**

The image setter, called the **CG 9700**, can accommodate page widths of up to 108 picas. It outputs complete pages with text and graphics in position and sets type in sizes ranging from four to 999 points in half-point increments. It provides standard storage of up to 300 fonts on-line.

Resolutions are 1,200 or 2,400 dot/in. for text and 1,200 dot/in for graphics. Maximum speed is 10 in./min. Characters can be rotated in one-degree increments, and pages can be rotated in 90-degree increments.

The CG 9700 will be available in the first half of 1988 at a price of $95,000.

Compugraphic, 200 Ballardvale St., Wilmington, Mass. 01887.

Processors

A single-board computer for Multibus II systems, called the **MT68020A**, has been introduced by **Microbar Systems, Inc.**

The board was designed for use in multitasking applications using real-time or multiuser operating systems. It is based on the Motorola, Inc. MC68020 32-bit microprocessor and is available in 12.5- and 16.67-MHz versions.

Features include 1M to 4M bytes of on-board dual-ported random-access memory and an on-board small computer systems interface controller. On-board options include the Motorola 68851 Memory Management Unit and the Motorola 68881 Floating Point Coprocessor.

The 1M-byte MT68020A is priced from $2,373.

Microbar Systems, 785 Lucerne Drive, Sunnyvale, Calif. 94086.

A product said to provide the NEC Information Systems, Inc. Model 1500 workstation with full-motion video capability has been announced by **NEC Information Systems.**

The **Video Information Processor** accepts National Television Standard Code level and cable television video signals. Under program control, the processor allows window location and size and channel selection.

The 20-in. noninterlaced display features a landscape format and 1,280- by 1,024-pixel resolution. It is capable of displaying 256 colors from a palette of 16 million and provides up to 4M bytes of memory. Three RS-232C serial ports are standard, as are a 5¼-in. floppy disk drive and an 86M-byte hard disk drive.

The Video Information Processor costs $9,995.

NEC Information Systems, 1414 Massachusetts Ave., Boxboro, Mass. 01719.

Data storage

A mass-storage subsystem designed to provide Hewlett-Packard Co. HP 9000 Series 200, 300 and 500 computers with file- and disk-sharing capabilities for up to three users has been announced by **Bering Industries.**

The **Multiport** storage subsystem is available with a choice of 20M-, 40M-, 50M- or 70M-byte Winchester drives. The fixed drive can be configured for two or three users. Eash user has an equal amount of space on the fixed disk and also has access to the 20M-byte removable Winchester disk drive.

Features include built-in 20M-byte backup, a special traffic program that prevents more than one user from editing the same document simultaneously and increased users' security.

Prices for the Multiport are 20M bytes for $4,790; 40M bytes for $5,390; 50M bytes for $6,190; and 70M bytes for $6,990.

Bering Industries, 360 El Pueblo Road, Scotts Valley, Calif. 95066.

A disk storage system based on multiple-spindle Winchester technology, a proprietary disk controller and an open-architecture network has been introduced by **Recognition Concepts, Inc.**

Called **Visistore**, the storage system is said to transfer data at sustained rates greater than 18M byte/sec. Its storage capacity ranges from 600M to more than 20G bytes.

Random access of 8, 12 or 16 bit/word data records is accomplished within 60 msec, according to the vendor.

Four versions of the product are available: the Visistore 20, 40, 60 and 80, with respective bandwidths of 4.5, 9, 13.5 and 18M byte/sec.

Visistore prices start at $35,000.

Recognition Concepts, P.O. Box 8510, 341 Ski Way, Incline Village, Nev. 89450.

Terminals

An electronic receipt and validation terminal called the **Marchant Cashier Model VR-1000** has been introduced by **Marchant**, a division of Addmaster Corp.

According to the vendor, the Cashier Model VR-1000 has the ability to allow users to receive various forms of payments, validate invoices or other forms, endorse checks for deposit and apply payments to various accounts.

The Cashier Model VR-1000 also has the ability to stamp documents with the time and date in addition to a personalized endorsement message, according to the vendor.

Other features include a transaction journal and batch- and log-summary reports for each payment type and account. An optional RS-232 port is available for on-line communication to a host computer.

The Marchant Cashier Model VR-1000 is priced at $1,595.

Marchant, P.O. Box. 5016, 2000 S. Myrtle Ave., Monrovia, Calif. 91016.

Input devices

A **plug-in circuit board** said to provide enhanced capability, including alphanumerics, for bar code scanning devices used with its Datacaptor IV point-of-sale terminal has been announced by **Datacap Systems, Inc.**

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'We, the people' in the computer age

The U.S. Constitution's balance of power stands up 200 years and billions of bits later

BY ALAN F. WESTIN

P. CHARLES LADOUCEUR

Suppose we could use H. G. Wells' time machine to transport the 55 framers of the Constitution from Philadelphia in 1787 to 1987's bicentennial celebrations. The framers would look with wonder at the continental spread of the nation, the size and diversity of its population, the economic wealth this country has accumulated and the urban centers and suburban rings we have created. They would see the position the U.S. maintains as a leading world power as well as other features of modern American life.

But it would probably be the sweeping technological progress our society has accomplished that would most dazzle the men of Philadelphia. They would stare at the self-propelled modes of transportation, both on the ground and in the air. They would marvel at the ways in which raw power can be harnessed and how that power can be used to benefit — or harm — mankind. They would be amazed at the extent of automation and technological influences — from mechanized agribusiness and high-tech hospitals to microminiaturized listening devices to supercomputers.

After they had taken in the enormity of these technological changes, we can imagine the men of Philadelphia asking their contemporary hosts one basic question:

"Pray tell us, have these powerful technologies, and especially those that have come on so rapidly in the decades since your World War II, had direct impact on the structure and processes of constitutional government?

"More specifically, have they worked significant changes in the four central elements of the Constitution (and the Bill of Rights) that we left you as our legacy: separation of power, federalism, representative government and individual rights?"

How would we answer the framers?

Relativity in technology

Technologies involving energy, transportation, production, food and medicine exert enormous effects on our economic, social and personal lives. Weapons technology creates the perilous world of nuclear confrontation and portable terrorism we inhabit so nervously today.

Such technologies create substantive areas for government action — to promote, regulate and sometimes prohibit. They lead us to create new government agencies and, taken all together, help explain the rise of independent regulatory agencies as a so-called "fourth branch" of the government.

But, I submit, these kinds of technologies do not affect our constitutional structure and processes per se.

Two other technologies *could* create such an effect. These deal with that unique commodity on which government depends for its understanding and decisions, which governors use to administer programs and protect their institutional positions and on which the governed rely to protect themselves and inform their participation. That commodity is information.

The two relevant technologies dealing with information are television and computers. Television collects information from anywhere in the "global village" and, through the filter of

Westin is professor of public law and government at Columbia University in New York. His 23 books include *Privacy and Freedom* (1967), *Databanks in a Free Society* (1972) and *The Changing Workplace* (1985). He has chaired and served on many panels of the U.S. Congress's Office of Technology Assessment. This article is an expanded version of an article to appear in Burke Marshall (ed.), "A Workable Government: The Constitution After 200 Years" (W.W. Norton, Fall 1987).

- **What the framers would think of high tech**
- **Personal data in government data banks**
- **Don't underestimate inertia and tradition**

those directing the coverage, presents the images of events, people and transactions directly to the people watching the screen.

Most analysts assessing the impact of television during the past 25 years would advise the framers that television has weakened political parties by giving candidates an independent route to constituents' minds and pocketbooks and that it has helped some presidents (the "Great Communicator" Ronald Reagan) while harming others (Richard Nixon with Watergate or Lyndon B. Johnson with Vietnam). They would mention that television has helped dramatize serious social injustices and thereby assisted in their correction by legislation or judicial decision.

Television's high costs have also reinforced the advantage of wealth in U.S. politics. Some even believe that the 30-second political commercial, with its tremendous potential to distort, is almost grounds for removing First Amendment bars to forbid such practices.

Despite this impact of television on our political processes and on the effectiveness or ineffectiveness of political leaders, I submit that television has still not directly affected the four central elements of the constitutional blueprint, that is, separation of power, federalism, representative government and individual rights.

Which brings us to computers. More precisely, it brings us to the blend of computer hardware and software, communications systems and management science techniques that is increasingly called information technology. We would quickly brief the framers to understand that we are becoming an information-based society, in which almost all government agencies, businesses and nonprofit organizations now own computers (large, medium or small) or utilize data processing services.

The framers would see that whereas computer systems were once the tools of the rich and powerful and consisted of huge mainframes and facilities to house them and whereas, once, platoons of highly paid systems experts and programmers were needed to write their instructions, we have progressed to an era of cheap, easy-to-use, distributed computing, available on the desktop or laptop.

Today, the American Civil Liberties Union, the Rev. Jesse Jackson, the Rev. Jerry Falwell, Ralph Nader, the National Association of Manufacturers, Cesar Chavez and the *National Review* all depend on computers to massage their membership, readership or contributor lists. The fearsome cry, "The computer is down," strikes terror in the hearts of black and white, government official and business executive, liberal, conservative and middle-of-the-roader alike.

Given the ubiquity of information technology and our dependence on it to carry out the business of contemporary life, there is a proper sense in which we should regard computers as a control technology. We should ask whether the computer's potential to change the nature, form and distribution of information for public affairs has or could affect basic balances of the constitutional system.

The negative case

When computer systems began their entering organizational affairs in the 1960s and as their use expanded in the '70s and '80s, social analysts began to warn that the power of this new tool could lead to power shifts in our constitutional balances:

- Computer power in the hands of federal and state executive branches could enhance the power of those agencies against legislative oversight and control or diminish the capacities of the judiciary to apply constitutional limitations, thereby upsetting the checks and balances system.
- Large-scale computerization might expand national power over social programs in ways that would curtail the independence and vitality of state and local government, undercutting healthy federalism.
- The growth of large data banks and computerized operations could shrink the openness and

availability of government information to the public and to the interest groups and media that facilitate "the people's right to know" what government is doing.

In addition, advanced computer operations might lessen the incentive for citizen participation as policies became more technocratic and less democratic in execution.

• Critics warn that computerized data systems in government, collecting and integrating millions of personal records on citizens, could result in a massive loss of privacy, denial of due process and chilling effects on expression and dissent.

These fears make up the negative case, or the Orwellian scenario, when contemplating the spread of information technology in our era.

The positive case

There has also been a 180-degree different line of analysis about the potential and the tendencies of information technology for our constitutional system. Some technological enthusiasts say computers could be the best thing for constitutional government since the framers did their work in Philadelphia:

• By providing more information-based resources for policy decisions and developing improved feedback on program effects, the use of information technology could enhance cooperation between the executive and legislative branches and give the judicial branch sounder bases for reviewing the actual effects of government programs.

• By better connecting the contributions and activities of federal and state governments in national social and regulatory programs, information technology could reduce the fractionalizing of policy administration and support the "marble cake" reality of intergovernmental administration.

• Proper use of information technology could enhance the public's access to government information. Additionally, the development of electronic plebiscites and direct citizen input through telecommunications could easily expand citizen participation.

• Because computer systems improve government's ability to identify individual differences and respond to them, automated information systems can enhance the diversity of treatment of citizens while protecting those dimensions of rights that call for equality and due process.

In short, we would note to the framers, we have developed a line of optimistic forecasting that competes vigorously with the pessimistic analysis first reported.

ALL OF THE computer systems in the federal establishment cannot break through the court's jurisdictional filter, nor do they change the concepts of rationality and constitutional presumptions that the justices apply.

Once the framers had learned about the proliferation of information technology and had been exposed to the pessimistic and optimistic scenarios just summarized, they could be expected to offer several general observations. Drawing on their knowledge about governance from the days of Athens and Rome down through the constitutional struggles of the 16th through the 18th centuries, they might remark as follows:

"Dear fellow Republicans, we could not tell a modem from a moped, but we believe we have learned some things about politics and government that would surely be applicable to your age of computers.

"First, it is prudent to assume that new and powerful tools will be taken up and used by those in power to advance both the programs they believe in and their capacity to carry those programs out more effectively against opponents inside or outside the government. Therefore, to the extent that new tools do confer greater power and cannot be easily matched or overcome, assume that what can be done effectively and what is not flagrantly in violation of public values will probably be sought to be done.

"Second, do not, as a consequence of assuming the worst case, underestimate the forces of custom and inertia or assign too little strength and vitality to those institutions and processes we gave you for controlling abuses of power. If our checks and balances have not been allowed to fall into disrepair and disuse, do not assume they will be easily thrust aside.

"Finally, when looking at opportunities to improve institutions and processes through new tools, take carefully into account existing interests and beliefs, and consider where the energy and power must come from for such innovations to prevail."

Having reminded ourselves of how the framers would have approached the tasks of technology assessment and forecasting, let us see what we think has taken place over the past several decades in terms of information technology's impacts on our constitutional system, examining both the pessimistic and the optimistic scenarios.

Separation of powers

First, despite the proliferation and accomplishments of computer systems, there have been and continue to be major system design problems and internally destabilizing effects of agency automation. This stems partly from the dynamic and constantly changing arrangements of hardware, software and telecommunications techniques that make up computer systems.

In addition, after mastering what can be seen as the "easy tasks" of computerization — automating the most objective and routine information processing functions in government work — most agencies are now attacking more complex problems.

These agencies seek to provide more customized services to clients, apply more fine-grain decision-making criteria to standards set by legislators, replace experienced employees with software-driven decision systems, improve real-time feedback on operations and trends and support powerful management information systems for planning and decision making.

Uneasy applications

Given these realities, accurate observers of agency automation are aware that failures, mishaps and sheer confusion accompany almost all the experiences of agencies in using information technology. The Social Security Administration, the Internal Revenue Service, the Veterans Administration, the Air Force and other federal computer users (to cite only federal examples) have troubled histories of computer use and remain caught up in difficult struggles with their present ambitious systems.

In short, applications of information technology to the complexities and contradictions of public policy implementation have not been easy, nor have they

overcome serious problems in service delivery and management effectiveness.

This is critical to understand because it helps explain why neither Congress nor the Supreme Court has lost significant power thus far as a result of executive branch computerization.

There was a short period in the mid-1960s when the so-called "McNamara Thrust" seemed to mark a pronounced shift of authority away from Congressional oversight and toward expert executive decisions. This stemmed from then-Defense Secretary Robert McNamara and his cadre of systems analysts' reliance on computerized support systems for cost-benefit analysis of defense policies and programs.

The language and techniques of program budgeting and systems analysis were touted as a new and scientific approach to policy-making for both foreign and domestic affairs.

Members of Congress and their staffs were sometimes portrayed as traditionalists who lacked not only the technical resources to match McNamara's team's computer printouts but also the disciplined mind-set to formulate and support alternate policy positions.

At least as early as 1966 and 1967, that situation had been corrected, at least from a separation-of-powers standpoint. Congressional staffs and their support agencies — the General Accounting Office, for example — challenged the manipulated computerized statistics of the Department of Defense (for the "Safe Village" program in Vietnam, for example). The mystique of "system analyzing" was exposed by the objective realities and deep policy dissents concerning the war.

Getting domestic

On the domestic side, Congress quickly learned how to use its powers of authorization for new agency computer systems, its appropriation controls over spending for machines and personnel, its rules for procurement of DP equipment and its oversight powers over program operations and fidelity of agencies to Congressional policy directives for keeping agency uses of information technology within the bounds that the legislative branch considered wise.

A good example was Congress's total rejection of the IRS's 1974 proposal to create a massive automated tax administration system. Operating through a panel of its Office of Technology Assessment, Congress examined the IRS proposal for its consideration of issues such as tax equity, privacy, security and control over large-system complexities and simply said no to the IRS.

The Supreme Court has found adapting to the computer age even less troublesome. As long as the justices define the questions for constitutional decision and interpretation and control what elements of the information provided to them by the executive or the legislature will be treated as relevant, the Supreme Court will retain its customary powers to hold executive actions within the boundaries of what the justices apply as constitutional interpretation.

In none of the major Supreme Court decisions in the past 25 years involving intergovernmental powers has the role or the authority of the judiciary been affected by information technology arrangements. All the computer systems in the federal establishment cannot break through the court's jurisdictional filter, nor do they change the concepts of rationality and constitutional presumptions that the justices apply.

In summary, separation of powers — and the checks-and-balances system that reinforces it — is alive and well in the computer age.

The executive has not blown the other two branches away, nor has information technology dissolved the interbranch conflicts intended by the framers. Because the framers' concept *requires* the president and Congress to compete for authority, policy differences and political considerations inevitably overcome any semblance of "increased rationality" or "empirical data proofs" that executive agency computer systems might offer.

> NEITHER Congress nor the Supreme Court has lost significant power thus far as a result of executive branch computerization.

Technology in federalism

By the time computers entered government administration in the 1960s, federalism had already developed into the post-New Deal cooperative system in which the nationalization of social and economic affairs, the power of federal funding and the sources of program initiatives had moved decisively to the national government.

The question posed by computer use was whether this would propel the federal government even further into control through data centralization and management or whether state and local governments might use computers to redress or even reverse the "power-to-Washington" trends of 1934 to 1960.

Again, early developments proved rather misleading. Because of the cost-effectiveness factors in third-generation computing — giant mainframes holding centralized data bases and accessed by thousands of near or remote terminals — it seemed that either central or at least regional data banks in fields such as welfare, health or law enforcement would be inevitable.

In such a technology-driven arrangement, central rules, data banks and oversight would be in Washington and in the federal government's regional offices, leaving a reduced "local administration" under uniform systems to state and local government.

Technological changes and

political realities thwarted that scenario. First, the development of mid-size, micro and desktop computers and of cheap telecommunications made it technologically cost-effective to put both computing power and data bases wherever an organization or a group of cooperating governments chose to locate those resources. As a result, technology no longer dictated highly centralized information systems. Depending on what organizations sought to do and how they wanted authority and responsibility to be distributed, they could choose high, medium or low centralization or various combinations thereof.

Second, political debates over the proper role for Washington began in the 1970s and continue to be far more important in defining the relative power positions of the federal and state governments than the configuration of computer systems.

States beat back FBI

For example, invoking the tradition of state and local predominance in law enforcement and citizen fears about a national police force, the states, through their representatives in Congress, beat back efforts by the Federal Bureau of Investigation during the 1970s and early 1980s to obtain Congressional approval to build a centralized computer system for criminal history records.

This was attacked as a threat to state and local law-enforcement autonomy and a potential threat to civil liberties. It was also seen as an unwise increase in police power by having a police agency control the records needed by others involved in the criminal justice process.

The result was that the FBI was allowed to build and improve its National Crime Information Center, which handles wanted-person and stolen property records centrally and is used by local, state and national police agencies. However, the FBI was not allowed to build a central national criminal history record system.

Today, development efforts are proceeding to test a system of central national indexing while retaining storage and control of the actual records by the state agencies. Such a politically crafted system, now entirely supportable by technological capacities, illustrates the primacy of policy over technology in the federalism domain.

It also illustrates that many state and local governments have become adept, experienced and effective in applying information technology to their own tasks and offering quite powerful alternative models where there are shared or overlapping governmental functions involving federal and state or federal/state/local relations.

In short, federalism choices and arrangements remain issues of social and political policy; they have not been transformed or dictated by technology.

Technology and the citizen

Since campaigns, elections and the party system were not addressed in the Constitution, the two elements of representative government that need to be examined in terms of information technology's impacts are public access to government information and the general level and quality of citizen participation.

The negative view warns that shifting information from paper to machine-readable records might diminish the people's right to know. The assumption is that computerized data bases, accessed through software programs, might be less comprehensible to information seekers, allow the hiding or misdescription of relevant data, increase the cost of getting data or make less traceable the way in which government decisions would be made. These concerns, the framers would recognize, are not unfounded, given the long history of efforts at government secrecy and the tension between executive claims to temporary privacy for responsible decision making and the public desire to know what government is doing.

Because both freedom of information and privacy became central issues in the late 1960s and early '70s, Congress acted to insure that no techniques of data handling — automated or manual — would defeat basic rights of access. The Federal Privacy Act of 1974 required federal agencies to publish complete lists of the record systems they maintained, with personal information in them, and guaranteed inspection and challenge rights to subjects of the records.

The 1974 amendments to the 1966 Freedom of Information Act strengthened rights of public access to information held by the federal government. While neither statute addressed computers per se (unlike European data protection laws, which focused on the technology), the two laws, operating together, have effectively facilitated public access at the federal level.

In addition, a parallel situation developed in state and local settings.

In a 1974 field study that examined how Congress, interest groups, the media and social critics felt that computerization had affected their existing ability to access government information, I found the following:

- Computerization was not as important as legal rules and administrative practices in determining the availability of what was sought.
- The information seekers reported that where well-designed systems were present, on the whole, automation was improving the precision, timeliness and responsiveness of federal agencies to their requests.

When I reexamined this situation in

1984, two conclusions emerged. The facilitating effect of computerization per se continued as before. But the policies of the Reagan administration were seen as reducing the timeliness and quality of information sought. Executive agency public affairs and freedom of information staffs had been drastically reduced; a policy was instituted requiring lawsuits under the Freedom of Information Act rather than compliance upon request; and a policy was adopted of selling government-produced information to the commercial sector for fee-based distribution, where such data had once been disseminated by federal agencies free or at a low cost.

Again, information technology was decisively shaped by political and legal debates and their outcomes. And, as the framers would be happy to observe, the tradition of extraordinary openness of American government was well preserved despite policy issues in the current administration's approach to public access.

On the other hand, efforts to use information technology to improve dramatically the public's right to know or its electoral participation have not materialized as yet. Despite passionate advocacy by consumer leaders like Ralph Nader, we do not put public computer terminals in shopping malls or ghetto storefronts and allow citizens to look up which stores or manufacturers violate safety, health or other regulatory rules. We could do this, but we choose not to spend the public's dollars that way.

Nor have we designed and funded the electronic democracy experiments that would frame key public policy issues and put them to citizen expression or formal vote through terminal, telephone or two-way television. There are two reasons for this. First, there are serious problems that the framers would quickly recognize in the agenda selection, issue framing, deliberation periods and binding aspects of such electronic plebiscites.

Second, such schemes address the participation of the 90 million "haves" who are already interest group members and active voters rather than the 80 million "have-lesses," who are the nonjoiners and nonvoters that exist in our society. Unless a serious political movement to bring nonparticipants into the system is the driving force of electronic democracy, the disadvantages of such proposals far outweigh their supposed advantages.

Individual rights

Perhaps the most publicized fear about computerization is that it will lead, inevitably, to the collection and consolidation of more personal information about people; the reliance on such systems to control people's benefits, rights and opportunities; and the uncontrolled sharing of such files with other government agencies or private organizations. This relates not only to privacy rights but also to due process, freedom of expression and equality.

These concerns were raised by social commentators, interest groups and political leaders when computer use spread in the 1960s. This led — in the U.S. and other industrial democracies — to a burst of empirical studies and commission investigations to learn just what computers could and could not do, how computers were actually being used and with what effect on existing individual rights and whether new laws or organizational rules were needed.

AS THE FRAMERS would be happy to observe, the tradition of extraordinary openness of American government was well preserved despite policy issues in the current administration's approach to public access.

In the U.S., this produced the National Academy of Sciences report, "Data Banks in a Free Society" in 1972 and the influential report of the Health, Education and Welfare Secretary's Committee on Automated Personal Data Systems in 1973. These reports concluded that computer use had not yet produced the transformations of data collection, exchange and use that critics feared but that the technology was getting cheaper, more powerful and more reliable and that new laws and rules were needed if individual rights were not to suffer.

Legal safeguards

Whether we would have enacted national privacy laws had Watergate not occurred is an interesting question. But with that event as an unequivocal lesson in governmental information abuse, we decided that new legal safeguards designed to institutionalize fair information practices had to be installed.

As a result, a steady stream of federal and state privacy-protection legislation from 1970 to the present year has resulted. This legislation covers government files in general; credit, insurance, and employment reports; bank and financial records; tax information; medical and health records; educational records; and a variety of other fields.

Interestingly, it has not been the Supreme Court that has pioneered in this updating of the Bill of Rights for the computer age. While the Supreme Court acted in 1967 to reverse its narrow and inadequate 1928 reading that the Fourth Amendment was not applicable to government telephone tapping, the court's "reasonable expectation of privacy" standard has not been extended to cover citizen interests in government data banks. The court has left the definition of such rights to the legislative process.

Happily for the framers' blueprint, federal and state legislatures have responded. Enactment in the 1980s of federal privacy protections for subscriber data in cable systems and last year's Electronic Communications Privacy Act, covering communications on digital networks, cellular telephones and other new media, document that active protective legislation continues.

These new laws and organizational rules, it must be emphasized, were not natural by-products of technological innovation, nor were they bestowed as some kind of constitutional noblesse oblige by the government and private organizations adopting computer systems. Rather, these new rules were perceived as critical, publicized as necessary and fought for in the political trenches by ad hoc coalitions of interest groups that have been the "citizen's lobby" on privacy and due process protections in the computer age.

While consistently including civil liberties, union, minority, consumer and legal groups (the liberal component), the privacy coalitions have generally been able to mobilize representatives of specific record-subject populations whose lives would be affected by computerization: taxpayers, patients, insureds, bank account holders and so on. And, because the specter of a vastly more powerful government alarms conservatives as well as liberals, the privacy coalitions of the past two decades have often united a wide range of ideological positions behind laws and rules to safeguard individual rights in automated systems.

In short, every generation of Americans has to redefine and reassert constitutional rights as new socioeconomic conditions, governmental programs and

technologies create pressures for traditional rights to be discarded or diluted. The framers could be expected to give a small smile of satisfaction and remark, "The system works."

Today, there is little doubt that our society has more privacy protection laws and organizational privacy rules relating to use of personal data than it had before computers arrived. In terms of due process, individuals are empowered to see and challenge their government records, and we have lively litigation over citizen rights in both public and private data bank uses. These new rights and procedures are being actively applied by the federal and state courts.

But, as government moves in the next decade into federal agency integrated record systems of unprecedented size and complexity, as computer-matching programs pass individual names through dozens of files from various agencies and governmental levels and as medical testing activities raise the possibilities of national screening-result record systems, a healthy and sustained concern is called for. Much new political mobilization and societal attention will be essential if the gains of the past two decades are to be preserved.

Technology's impacts

Our inquiry into the effects of information technology, it should be noted, has been framed at the macro or "regime" level, and we have found that neither the negative nor the positive projections have taken place as predicted. However, we hasten to note that information technology affects and will continue to significantly affect many vital areas of private and public life in the following ways:

- Information technology is reshaping work patterns and employee-employer relationships, greatly improving some work and impoverishing other jobs.
- Information technology is transforming industry definitions and arrangements, creating a global, rather than a national, production and marketing system and altering basic public expectations about consumer services.
- Information technology is transforming the way client services are organized and delivered by government agencies and may well reshape the structures of these agencies in the coming decade.
- Information technology continues to rearrange power and roles within large private and public organizations.

Calming the turmoil

Those changes are deep and important. And they come at a time of significant turmoil in American organizational life. At the federal government level, for example, there are serious problems with fiscal resources, labor-management relations, organizational processes and cultures and management of large-scale information system projects. There is also considerable uncertainty in Congress about how to perform the oversight role in this milieu.

In the private sector, the ferocity of domestic and international competition, the short-term-profit pressures and the "lean and mean" doctrines of enterprise operations threaten to take the enormous promise of office systems technology — for improved quality of work life and customer relations — and transform it into factory-like office automation.

Furthermore, while access to data base information and inter-organizational networking has spread rapidly in the government, business and media sectors, this major enhancement in information-access capability has not yet been developed in and made available to the voluntary group sector.

If the 30,000 or more national voluntary groups in America are to play a critical role in promoting new ideas and serving as independent critics of government and private institutional policies, ways need to be found to readdress the growing imbalance between information "haves" and "have-lesses" in the national policy process.

These are profoundly important problems, but they are not at the regime level. Even taken together, they do not constitute

present impacts on the four major constitutional balances.

What information technology has and has not done to the four great mechanisms of our Constitution tells us some very important things about the nature of our constitutional system, the political culture and value system that spawned and sustains it and the ways that democratic societies have learned to look at and deal with powerful new technologies.

First, even as powerful a technology as computers flows along the deep, rock-like channels of a society's values, politics, laws and institutions. When we think about how to use computers (or how society will allow government and the private sector to use computers), we follow those channels and the pathways of action that they structure.

Second, the reception and shaping of information technology applications during the past 25 to 30 years attests to the strength of our interest-group advocacy system, the generally pro-civil-liberties orientation of our mass media, the widespread and nonpartisan distrust of authority and concern for its proper control and the general public readiness to defend constitutional norms, once alerted to threats to such values. It is these forces, not inherent limitations or benign properties of the technology, that have offered the best protection.

The past two decades attest also to the continued vitality of the separation-of-powers competition and federalism conflicts that the framers deliberately installed to help safeguard against potential abuse of power, whether by new tools or any other mechanisms.

Finally, the men of 1787 would probably react to this review of how technology has affected their handiwork by observing that they would have expected no other outcome. They might chide us gently: "We can understand how you might see such powerful technologies as these computers as a deus ex machina, something that would vault over the national political culture and the institutions it spawns and allow the deliberate creation of radically alternative systems. Some of your liberals want this to produce more egalitarian systems, with greater citizen participation and control over large institutions. And some of your conservatives wish to use computers to achieve more orderly social systems, to foster private decision making and to control antisocial groups more effectively.

"But even though new computer systems provide a wonderful handle with which to get media and public attention to such proposals for drastic change — in the name of controlling or using new technology — the ultimate test of such essentially political proposals is how well they fit with current political moods and system-support orientations of the national public. New technology applications will inevitably be accepted or rejected according to such fundamental balances of power, interest and ideology.

"In fact, we detect in much of your generation's thinking and writing about technology a tendency to seek relief from the struggles over wise policy and its administration through a focus on new machines. However, we are confident that the progress of the U.S. — if you and your adversaries do not blow up the world, of course — still depends more on the nurturing of a democratic civic culture, the attraction of the best people to government, the vitality of political participation, the pursuit of equality and justice, the continued productivity of the economy and the creative use of constitutional balances than on anything these information machines can accomplish."

Computer professionals

It seems appropriate to conclude by asking what roles computer professionals have played and should play in the accommodation of information technology to the American constitutional process.

When computer systems first appeared, a leading edge of computer scientists accepted the responsibility of alerting policymakers and the public to the problems and potentials of computer technology. Then, the major associations and publications in the computer field began to give sustained coverage to issues of privacy, security, due process, equity, citizen access to information, management of large public systems and so on.

Legal and social science experts working on these issues came to depend on such coverage and on debates among computer professionals to keep them informed about trends. Noncomputer experts were much more effective in alerting the public and lawmakers to problems because of the professional reportage and commentary available to them.

This vital service to guardian groups and public policymakers needs to be continued and even accelerated in the next decade. Even though there are natural divisions among computer professionals by ideology and interest, the airing of social-impact discussions about new information technology developments serves as a vital early warning signal for interest groups and political leaders. A high-technology society needs every bit of lead time it can get to consider such potential social impacts of computers and to decide on appropriate policy responses.

At least some of the framers would expect no less from leading computer professionals. Thomas Jefferson, a symbol in his day of commitment to science and liberty, might have called it a sacred duty of such professionals to country and Constitution. Surely, it is the appropriate bicentennial message to be heard and heeded by American computer professionals. •

It's not a minicomputer you will outgrow. It's not a PC network that promises more than it can deliver. It's not a mainframe you can't afford...

Unisys announces the birth of the Smallframe.

You're invited to celebrate the arrival of the newest member of the Unisys product family, as well as the birth of a new concept: The Unisys Smallframe.

It's three different tiny computers: A1, A4 & A6. Each built to fit in the same size cabinet, each with a small footprint and a low price. (That's what we meant when we said "Small.")

But each starts you running true mainframe applications economically and quickly. Plus, Smallframes use the same operating system as our biggest A Series mainframe—and every machine in between—without any software conversion. (That's what we meant by "frame." As in main*frame*.)

What potential!

With the newborn A1, the smallest of the Smallframes, Unisys now gives you a clear, continuous growth path of more than 100 times in computing power.

That means if you're running a small business or department with the A1, you can use proven mainframe software on a computer that costs about the same as a mini. And because the A1 is part of a broad line of compatible machines, your data and software investments are safe as you grow.

Meet the family.

The A1, A4 & A6 are the youngest and smallest members of the respected Unisys family of A Series mainframes. The series includes machines that run major banks, governments, schools, hospitals and businesses all over the world. An independent survey of mainframe owners found Unisys systems scored the highest five year average in overall satisfaction.*

While Smallframes are about the size and price of minis, the top of the A Series isn't a set of minicomputers playing together. It's the A15, one of the largest and most powerful true mainframes money can buy.

Between the A15 and the A1, there are 12 other models.

*Computerworld, June 15, 1987, survey by Datapro Research Corporation.

All compatible over the line—and over time. Software written for any model or generation over the last 17 years is compatible with any current A Series model.

Since all three are built for the same size cabinet, the A1 itself is field upgradeable to A4 and A6 levels—a better than 3 times increase in computing power.

Doesn't cost much.

You already know the A1 gives you mainframe quality for about the price of a mini.

But what about the rest of the A Series? From the moment of conception, every computer in the family is designed to be easy to get along with and cost very little to run.

That means reasonable purchase price. Low operating costs. Low training costs. Even low software development costs, thanks to the powerful A Series operating system and LINC—the well-known fourth generation language from Unisys that can cut programming time by a factor of ten or more.

Grandpa's eyes.

All in all, the best thing about the Smallframe is that it sees the world the same way the powerful A15 and the whole A Series does. You might even call it a "chip off the ol' box." It's got the same operating system. Same interfaces. And it will even communicate with IBM machines.

So whether you want a small computer with a virtually unlimited conversion-free expansion path, or you've got a large Unisys computer and need a smaller yet fully compatible department level system, call the proud parents at Unisys.

We'd love to stop by with all the information you need. And show you pictures. After all, a new arrival like this is worth celebrating.

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On April 2, IBM made PC history. Eight weeks later, we rewrote it.

April 2, 1987.

To most computer add-on companies that was the date IBM dropped the bomb. With the introduction of PS/2 personal computers, the Micro Channel® revolution had begun.

The effect on our competitors? Many were prepared to do little more than count big inventories of emulation products for old PCs.

But we were ready.

Within eight weeks we began shipping the first Micro Channel communications product. IDEAcomm 5251/MC.™ The board that connects the new PCs to the System 3X.

How did we do it? The answer is simple. We don't rely on outside development sources.

We have our own in-house R&D team. The same team that pioneered Surface Mount Technology (SMT) on computer cards. The very same manufacturing technique used heavily in the PS/2 design.

The result of these efforts is an add-on board that redefines the limits of PC communications. It provides 5292 Model 2 emulation. Support for 132 columns in 3180 emulation. And windows to monitor the real time status of multiple sessions on one PC screen. *Q38 Technical Journal* declared, "... while IDEA is delivering an emulation card that works completely, the other guys are just playing catch-up."

Which, historically speaking, is exactly the position we're inclined to take. For more information on the IDEAcomm 5251/MC, call 800-257-5027.

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TAKING CHARGE

Les Gilliam

Five keys to productivity

I assume all MIS directors would like to improve the productivity of their staffs. Yet, I wonder how much serious attention they give the subject. Where does "productivity improvement" appear on their prioritized list of objectives?

You may be thinking of productivity improvements as simply performing tasks in a shorter period of time; in other words, improving efficiency. But the greater gains will likely come in omitting tasks that contribute little toward organizational goals and redirecting employees' time and talent toward tasks that have a higher potential benefit for the organization.

Five primary factors serve as barriers or gateways to improved productivity: skills, knowledge, tools, opportunity and motivation.

Skills. Data processing is a technical field, and technical skills are necessary for success. Careful hiring procedures help ensure that each employee starts with at least the minimum

Continued on page 94

Hopper: The right stuff at AMR

BY DAVID A. LUDLUM
CW STAFF

With the success of American Airlines' Sabre reservation system celebrated far and wide, the name Max Hopper is as likely as any to be associated with the use of computers to forge a competitive advantage in business.

A look at Hopper's career beyond the Sabre success story reveals not only the foundation he laid for it, but also the limitations and frustrations he encountered trying to duplicate that success in a more challenging environment.

Hopper, a top executive with American Airlines' parent AMR Corp., achieved prominence in the 1970s by leading the airline's distribution of Sabre to travel agents. The move, challenged in lawsuits for creating too great a competitive edge, has racked up profit margins of more than 25% on the airlines' revenue.

Hopper found the going a lot tougher, however, in trying to help overhaul the calcifying international empire of Bank of America, which was the largest U.S. bank as recently as 1980 but is now half the size of Citibank N.A., the current leader. He joined Bank of America in 1982 and three years later abandoned his efforts there to return to AMR.

He did so, he says, to take advantage of a lucrative offer, even after Bankamerica Corp. countered it. He staunchly denies that difficulties with a huge, innovative conversion of the bank's transaction processing system affected his departure or left him out of favor with top management there.

Colleagues at other firms cite several keys to Hopper's rise. Among them are sheer imagination and insight. "You have breakfast with Max, and your blood is coursing all day," says David J. Barber, president of Interactive Training Systems, Inc. in Bedford, Mass., which has developed an interactive video kiosk promoting vacation travel for AMR.

PROFILE
Max Hopper

***Position:** Senior vice-president, American Airlines.*
***Mission:** To support American, operate the Sabre reservation system and oversee a collection of niche-market information service businesses.*

Business foresight

Specifically, colleagues say Hopper long anticipated the use of computers to further business strategies. "He has been building that theme through most of his career," says Glen Belden, vice-president of planning at United Airlines, who worked with Hopper at that company.

Hopper has worked hard, broadened his activities and sought new opportunities. Belden calls him "an intense, hard-working person" who believes in what he is doing.

Right now, as senior vice-president of American Airlines and head of AMR Information Services, Inc., Hopper says he works 70 to 80 hours a week.

Trained as an engineer, Hopper responded early in his career to business needs as well as technological challenges, he says. "I climbed in those bones nearly as much as any systems engineer," he says of his work at Shell Oil Co. during the early 1960s. But, he added, "even though I found the technology extremely fascinating, I was more interested in how it could be used."

Hopper, 53, is heavyset with dark hair and a dark complexion. He grew up in the eastern Texas oil country, a background suggested by the hint of a twang in his voice.

His family was of modest means, his father a labor leader and later a roofing contractor, his mother a hospital worker. He left the University of Texas at Austin because of lack of money after two years of studying chemical engineering.

Hopper became a technician at Shell's research lab in Houston and then did security work in the Army with an eye to GI tuition benefits. Supporting a wife and son, he went back to Shell

Continued on page 90

Hot future for DP pros

Employment of computer programmers and systems analysts will grow much faster than the hiring of any other occupational group between 1986 and the end of the century, according to the U.S. Bureau of Labor Statistics.

The bureau projects that overall employment will grow 19.2% by the year 2000 but foresees jumps of 75.6% for systems analysts and 69.9% for programmers, according to estimates to be discussed in the forthcoming issue of "Monthly Labor Review," a bureau publication.

The next-highest projected growth rate is for guards, at 48.3%. Following that are electrical and electronics engineers, at 47.8%, and computer operators, at 47.2%.

The bureau projects a labor force that is increasingly female, black and Hispanic, with women accounting for 63% of the growth between 1986 and 2000 and ethnic minorities accounting for 57%.

It also projects continued growth of employment in service industries, trade and construction, with a slight overall decline in manufacturing.

In manufacturing, the computer industry is expected to be the fastest growing segment, adding jobs at a rate of 20.3%, or 1.3% a year.

The 19.2% growth in employment through 2000 would be down sharply from 32% between 1972 and 1986 because of slower population growth.

LOCAL HAPPENINGS

NORTHEAST

Boston, Sept. 10. Data Processing Management Association (DPMA) Boston Chapter Computers and the Weather, with Bruce Schwoegler of WBZ-TV. Anthony's Pier 4 Restaurant. 5:30 p.m. Contact: DPMA, P.O. Box 1806, Boston, Mass. 02105.

Boston, Sept. 10. Society for Management of Professional Computing, Inc. New Trends in Work Group Software, with Esther Dyson of Edventure Holdings, Inc. The Great Hall at Quincy Market. 11:30 a.m. Contact: SMPC, 715 Boylston St., Boston, Mass. 02116.

New York, Sept. 17. Teltech CICS Users Group. Performance Analysis in CICS/VS, with Tom Harper of BMC Software, Inc. Citibank, 399 Park Ave. 1:30 p.m. Contact: Teltech, 39 Broadway, New York, N.Y. 10006.

New York, Oct. 14. DPMA Financial Industries Chapter. Principles of Project Management, with Thomas E. Conlon of Sherwood Securities Corp. Harry's of the American Exchange, 113 Greenwich St. 5:30 p.m. Contact: Dick Leffen, DPMA, P.O. Box 894, Wall Street Station, New York, N.Y. 10005.

New York, Oct. 14. Association for Women in Computing New York Chapter. Annual Fall Reception.Contact: AWC, P.O. Box 2293, Grand Central Station, New York, N.Y., 10163.

Harrisburg, Pa., Oct. 14. Central Pennsylvania Chapter, Association for Systems Management (ASM) International. Tour of DP center, City of Harrisburg. Harrisburg City Hall. 7 p.m. Contact: Mark Anderson, 809 Acri Road, Mechanicsburg, Pa. 17055.

Augusta, Maine, Oct. 21. Maine Pine Tree Chapter of the DPMA. People Skills, with Sally Harwood of University of Maine. The Senator Inn. 5 p.m. Contact: J. Fiewegar, Delta Chemicals, Inc., Searsport, Maine 04974.

SOUTHEAST

Macon, Ga., Sept. 15. DPMA Middle Georgia Chapter Ergometrics, with James Gaudet. Holiday Inn, Interstate 75. Contact: L. L. Purcell, P.O. Box 4, Macon, Ga. 31202.

Charlotte, N.C., Sept. 17. ASM Queen City Chapter. Fifteenth anniversary celebration and Building Your Own Company, with John W. Weil. Cosmos Steak House, 5100 E. Independence Blvd. 6 p.m. Contact: Robert Yearwood,Metro Information Services, Suite 140, 7 Parkway Plaza, Charlotte, N.C. 28217.

Richmond, Va., Sept. 22. Richmond Chapter of the ASM. Hallmarks of Well Being, with C.B. Gill of Luben Associates. Downtown Club of Richmond, 801 E. Main St. 5:30 p.m. Contact: Gary Morse, ASM, P.O. Box 32172, Richmond, Va. 23294.

Lafayette, La., Sept. 24. Acadiana Chapter of the DPMA. Monthly meeting. Evangeline Steak House, Highway 167 South. 6:30 p.m. Contact: Debra Billeaud, 4th Floor, Guaranty Bank and Trust Co., 200 W. Congress, Lafayette, La. 70502.

Columbia, S.C., Oct. 1. ASM Midlands Chapter. Student Night. Quality Inn, I-20 and Broad River Road. 5 p.m. Contact: George F. Hayhoe, 118 Park Ave. S.E., Aiken, S.C. 29801.

Chamblee, Ga., Oct. 13. ASM Atlanta Chapter. Robotics: Today and Tomorrow, with Les Ottinger of Advanced Manufacturing Systems, Inc. Holiday Inn Chamblee-Dunwoody, 4386 Chamblee-Dunwoody Road. Contact: Jane Roberts, HBO & Co., 1 Ravinia Drive, Atlanta, Ga. 30346.

Charlotte, N.C., Oct. 15. ASM Queen City Chapter. Productivity in Systems Development, with Olin Broadway of Broadway & Seymour, Cosmos Steak House, 5100 E. Independence Blvd. 6 p.m. Contact: Robert Yearwood, Metro Information Services, Suite 140, 7 Parkway Plaza, Charlotte, N.C. 28217.

Macon, Ga., Oct. 20. DPMA Middle Georgia Chapter. Stress Management, with Nancy Ridley of Charter Northside. Holiday Inn, I-75. Contact: L. L. Purcell, P.O. Box 4, Macon, Ga. 31202.

MIDWEST

Des Moines, Iowa, Sept. 14. Des Moines Chapter of the ASM. Sales and Service — the Inseparable Duo, with Don Bell of Batten, Batten, Hudson, and Swab. The Howard Johnson Inn, Merle Hay Road. 5 p.m. Contact: Joleen Montag, Integrated Resources Life Insurance Co., 3737 Westown Pkwy., West Des Moines, Iowa 50265.

Grand Rapids, Mich., Sept. 14. Grand Valley Chapter of the ASM. Function Point Analysis and CBT Training, with Allen Kallstein of M & I Data Services, Inc. Contact: Michael J. McCann, Byker, Van Popering & Bergsma, 3083 Washington St., Grandville, Mich. 49418.

Dayton, Ohio, Sept. 15. Megacity Chapter of the ASM. Desktop Publishing, with Robert Dice. Dayton Marriott, 1414 S. Patterson Blvd. 5:30 p.m. Contact: S. Beebe-Owen, Western Ohio Pizza, Inc., 2324 Stanley Ave., Dayton, Ohio 45404.

Toledo, Ohio, Sept. 16. Toledo Chapter of the ASM. Strategic Planning, with Bob Garrity of Price Waterhouse. The Edison Club. 5:30 p.m. Contact. Dale R. Briggs, Computer Services, Marathon Oil Co., 539 S. Main St., Findlay, Ohio 45840.

Wausau, Wis., Sept. 21. Wisconsin River Valley Chapter of the DPMA. Seminar: Managing Change; monthly meeting: Another Perspective on Change. Contact: Patricia Grasse, City-County Data Center Commission, 407 Grant St., Wausau, Wis. 54401.

Fort Wayne, Ind., Sept. 22. ASM Fort Wayne Chapter. The Chief Information Officer, with Dave Allen of Lincoln Life. Googlen's, 7311 Maysville Road. Contact: Beth Hubili, ASM Publicity/Newsletter, Suite 103, 10427 Leo Road, Fort Wayne, Ind. 46825.

Lafayette, Ind., Oct. 8. DPMA Sagamore Chapter. Career Planning for a Lifetime, with Terry Phillips. Judith Painter Catering, 101 Plaza Lane. 5:30 p.m. Contact: Joan Vaughan, MIS Department, Aluminum Co. of America, Box 7500, Lafayette, Ind. 47902.

Minneapolis, Oct. 8. The Minnesota Intellectual Property Law Association. Software Copyright Infringement: The Emerging Standard. Whitney Hotel, 150 Portland Ave. 1 p.m. Contact: Walter Linder, Suite 1500, 625 4th Ave. S., Minneapolis, Minn. 55415.

Toledo, Ohio, Oct. 14. ASM Toledo Chapter. Selling Men and Change to Management, with Ken J. Shea of Executive Support Systems. Heatherdowns Country Club. 5:30 p.m. Contact: Dale R. Briggs, Computer Services, Marathon Oil Co., 539 S. Main St., Findlay, Ohio 45840.

Dayton, Ohio, Oct. 20. Megacity Chapter of the ASM. Computer Security and Business Concerns. Dayton Marriott, 1414 S. Patterson Blvd. 5:30 p.m. Contact: S. Beebe-Owen, Western Ohio Pizza, Inc., 2324 Stanley Ave., Dayton, Ohio 45404.

WEST

Walnut Creek, Calif., Sept. 16. ASM East Bay Chapter. Monthly meeting. Contact: ASM, 32 Robert Road, Orinda, Calif. 94563.

Portland, Ore., Oct. 19-20. Effective Software Practices: The Fifth Annual Pacific Northwest Software Quality Conference. Sheraton Inn, Airport. Contact: Lawrence & Craig, Inc., P.O. Box 40344, Portland, Ore. 97240.

Walnut Creek, Calif., Oct. 21. ASM East Bay Chapter. Monthly meeting. Contact: ASM, 32 Robert Road, Orinda, Calif. 94563.

El Paso, Texas, Oct. 22. DPMA El Paso Chapter. Disaster Recovery (Bosses Night). International Club, Mimuk Tower. 5:30 p.m. Contact: Steve Tarro, Las Cruces, N.M.

CALENDAR

SEPT. 20-25

The Eighth Annual Data Design Users Conference. San Francisco, Sept. 20-23 —Contact: Data Design Associates, 1279 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Interex North American Conference of Hewlett-Packard Business Computer Users. Las Vegas, Sept. 20-25 — Contact: Interex Conference Department, 680 Almanor Ave., Sunnyvale, Calif. 94086.

Management Information Systems for Strategic Advantage. Philadelphia, Sept. 20-25 — Contact: Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104.

Systems Integration in Multivendor Environments: Dataquest, Inc.'s Business and Office Systems Conference. Littleton, Mass., Sept. 21-22 — Contact: Marina Pettijohn, Dataquest, 1290 Ridder Park Drive, San Jose, Calif. 95131.

Integrated Services Digital Networks. San Francisco, Sept. 21-22 — Contact: Customer Service, Frost & Sullivan, Inc. 106 Fulton St., New York, N.Y. 10038.

CD-ROM Expo. New York, Sept. 21-23 — Contact: IDG Conference Management Group, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701.

Corpcon Corporate Microcomputer Exposition and Technical Conference. Los Angeles, Sept. 21-22 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

Office Technologies Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

Engineering Workstations Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

CSM '87: Conference on Software Maintenance. Austin, Texas, Sept. 21-24 — Contact: The Computer Society of the Institute of Electrical and Electronics Engineers, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

10th National Computer Security Conference. Baltimore, Sept. 21-24 — Contact: Irene Isaac, B266 Technology Building, National Bureau of Standards, Gaithersburg, Md. 20899.

MAP/TOP Users Group Meeting. Dallas, Sept. 22-23 — Contact: The MAP/TOP Users Group, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

1987 Lawson Associates User Exchange Conference. Minneapolis, Sept. 22-25 — Contact: Lawson Associates, Inc., 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

5th Annual 1100 Data Center Management Conference. San Diego, Sept. 22-25 — Contact: Datametrics Systems Corp., 5270 Lyngate Court, Burke, Va. 22015.

Network Management Systems Expo '87. San Diego, Sept. 24-25 — Contact: Telestrategies, Inc., Suite 100, 1355 Beverly Road, McLean, Va. 22101.

Fifth Annual NCR Users Eastern America Conference. Fort Washington, Pa., Sept. 24-25 — Contact: Frank Whalon, c/o Timm Olsen Testing Machine Co., P.O. Box 429, Willow Grove, Pa. 19090.

SEPT. 27-OCT. 2

Information Systems Perspectives Symposium: Managing Information Systems in the 1990s. San Francisco, Sept. 27-30 — Contact: Guide International Corp., Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

67th ADAPSO Management Conference. Colorado Springs, Sept. 27-30 — Contact: ADAPSO, Suite 300, 1300 N. 17th St., Arlington, Va. 22209.

National Retail Merchants Association 29th Annual Retail Information Systems Conference. Chicago, Sept. 27-30 — Contact: NRMA Information Systems Division, 100 W. 31 St., New York, N.Y. 10001.

Ninth Annual Lasers in Graphics/Electronic Publishing in the '80s Conference. Orlando, Fla., Sept. 27-Oct. 1 — Contact: Lasers in Graphics, Suite 1, 1855 E. Vista Way, Vista, Calif. 92084.

Fall '87 SAS Users Conference. Toronto, Sept. 28-29 — Contact: Alexandra Miller, C130, West Office Building, York University, 4700 Keele St., North York, Ont., Canada M3J 1P3.

1987 National Communications Forum. Chicago, Sept. 28-30 — Contact: NCF87, Suite 4808, 505 N. Lake Shore Drive, Chicago, Ill. 60611.

Coping With Computer-Age Vulnerability. Amsterdam, Sept. 28-30 — Contact: Vulnerability Conference, P.O. Box 2039, Springfield, Va. 22152.

Tektronix User Group Meeting. San Francisco, Sept. 28-Oct. 2 — Contact: Donna Ronayne, Data Kinetics, 97 Norman St., Ottawa, Ont., Canada K1S 3K5.

Optical Disk and Engineering Drawings in the CIM Environment: User-to-User Forum II. Chicago, Sept. 29-Oct. 1 — Contact: Randy Martin, The Yankee Group, 200 Portland St., Boston, Mass. 02114.

Federal Computer Conference. Washington, D.C., Sept. 29-Oct. 1 — Contact: Bev Hughesor Jessica Kabanuky, The Federal Computer Conference, P.O. Box N, Wayland, Mass. 01778.

Fall National Design Engineering Show & Conference. New York, Sept. 29-Oct. 1 — Contact: Show Manager, Fall National Design Engineering Show, 999 Summer St., Stamford, Conn. 06905.

Imax 87: The Integrated Manufacturing Exposition and Conference. Chicago, Sept. 29-Oct. 1 — Contact: Carol Hurley, Penton Expositions Division, Suite 900, 122 E. 42nd St., New York, N.Y. 10168.

Laseractive '87. Boston, Sept. 29-Oct. 2 — Contact: Laseractive, P.O. Box 3415, Indialantic, Fla. 32903.

Optical Disk: Strategic Impact on Engineering Document Management. Oakbrook Hills, Ill., Sept. 30-Oct. 1 — Contact: The Yankee Group, 200 Portland St., Boston, Mass. 02114.

Fall Joint National Conference on Software Risk Management. Los Angeles, Sept. 30-Oct. 2 — Contact: Jerry Smith, QSoft, Suite 206, 2755 Hartland Road, Falls Church, Va. 22046.

Conference and Exhibition for Business and Professional Users of Apple Computers. Schaumburg, Ill., Oct. 2-4 — Contact: RJW Plaza III, c/o Randall Jackson, 1511 N. Bell Ave., Chicago, Ill. 60622.

OCT. 4-10

Financial Networks Workshop. Chicago, Oct. 4-6 — Contact: Ed Atwood, American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

CADRE '87: Annual Complete ADE Environment User Group Meeting. Las Vegas, Oct. 4-8 — Contact: Allen Haggar, Applied Data Research, Inc., Rt. 206 and Orchard Road, Princeton, N.J. 08543.

Second Annual Conference on Object-Oriented Programming Systems, Languages and Applications. Kissimmee, Fla., Oct. 4-8 — Contact: OOPSLA '87, P.O. Box 3845, Portland, Ore. 97208.

Issues of the Information Age:

PROMISES KEPT. PROMISES TO KEEP.

At the beginning of this century, Theodore N. Vail, president of AT&T, understood his competition not just as other telephone companies, but as distance, loneliness, separation. He foresaw that the success of his company could end the geographic isolation of man. And in ending that isolation, the company's success would be assured. The vision became reality: by the mid-'70s, America had universal telephone service.

Today, as the Information Age has begun, there is a new kind of isolation. People are awash in a mounting sea of information, yet unable to connect or work with information in an orderly, useful form; that is, with the world's knowledge. Often, information machines do little to help. They are difficult to use, rigid in their demands, generally unable to work with any but their own kind.

To overcome this new kind of isolation, we have a new vision: to make the Information Age universal, to help build a worldwide Telecommunity, not just open to all, but inviting.

At AT&T, we are now working toward the day when people around the world will be able to handle information in any form—conversation, data, images, text—as easily as they make a phone call today. And they will be able to get information in a form they can use, whenever they need it, from wherever it is.

We envision a vast global network of networks, the merging of communications and computers, linking devices so incredibly capable, they will bend to the will of human beings, rather than forcing humans to bend to theirs.

Obviously, no one company, no one nation, can universalize the Information Age. It will take the best minds of many companies and many nations. The needs of our customers are creating imperatives for our industry. We need common standards and compatibility. We need national and international policies that are open and encouraging. And we need to make information machines far easier to use.

We have the science to construct the systems now. The technology is rapidly taking shape.

We are dedicating our minds, our energy, our resources—our future—to making Telecommunity a reality. To bringing the best of the Information Age to the world.

Our vision has its roots in AT&T's heritage of service. Just as the telephone extended the reach of the human voice, Telecommunity will extend the reach and capability of minds and talents.

Telecommunity is our goal. Technology is our means.

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COMPUTERWORLD
MIS faces conflict in the mid-range
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Satisfaction

FROM PAGE 1

The respondents' overall satisfaction rating registered in the job satisfaction survey corresponds to the results of a separate salary survey conducted by *Computerworld* and the Data Processing Management Association, published last week, in which almost 70% of the nearly 1,500 respondents said they are pleased with their compensation and benefits packages, rating it as "good" or "excellent."

Among the specific aspects of MIS jobs that are most important to satisfaction are the following:

- The variety of responsibilities the job entails. Survey respondents say they are satisfied with this area.
- Salary and opportunity for advancement. Respondents give these factors relatively low satisfaction ratings.
- Work load and nonmonetary recognition. Again, respondents rate themselves as less than satisfied in these areas.

MIS professionals also say there are many intangible aspects of their jobs that contribute to satisfaction.

"There's a kind of ambience here that I like," says Jay Dahl, DP manager at Hatch Grinding Co. in Denver. Dahl has worked at Hatch for 16 years and likes the diverse responsibilities his position entails.

"In a pinch, I'll go out and drive a forklift if they need me to," he says.

Harris Koehn, senior systems analyst at Northwestern Memorial Hospital in Clarendon Hills, Ill., says he likes his job because his work leads to more efficient medical services and because he knows his co-workers well.

"I have grown up in my career with a number of people here," he says. Like many of the other respondents, Koehn says he has struggled with management policies. A recent change in management, however, has made him more satisfied.

"I was having a hard time finding good reception for new ideas, like implementing productivity tools," he says. "Now, there's a new director of the department, and the attitude against new ideas is not as entrenched as it used to be."

Short of changing their bosses, the majority of the respondents say their job satisfaction would improve if they could convince their companies to provide more recognition for MIS professionals and to implement better planning.

"A pat on the back is better than a raise for some people," says Bernie Scheidt, MIS director at Bruno Scheidt, Inc., a family-owned canned goods distributor in New York.

Other respondents report they would be more satisfied if they had more time to deal with their large work loads.

The research division of IDG Communications, Inc.'a marketing and communications group conducted this *Computerworld* job satisfaction survey. Of the random sample of 2,000 subscribers, 616 questionnaires were returned — a 32.73% response rate.

MIS and the issues

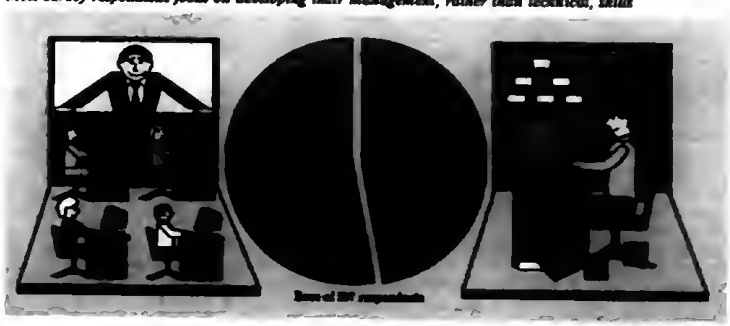
A barometer of workplace attitudes

	Strongly disagree	Disagree	No opinion	Agree	Strongly agree
Micros have diminished the power of MIS/DP in my organization	32%	50%	11%	14%	3%
Management views MIS/DP as important to the strategic position of the company	4%	22%	7%	48%	20%
Unrealistic upper management expectations and deadlines are never a problem for MIS/DP	39%	53%	10%	10%	8%
We never have enough money to do the job right	8%	41%	13%	33%	8%
End users are very satisfied with MIS/DP	5%	40%	13%	40%	3%
MIS/DP is a pretty unexciting vocation	35%	45%	8%	10%	8%
In comparison with other departments in my company, MIS/DP usually commands pretty high salaries	4%	17%	19%	51%	10%
I cannot keep up with new technologies and techniques	8%	40%	7%	41%	5%
Data communications complicates my job	8%	40%	15%	34%	3%
I have a high-pressure job	2%	23%	9%	46%	19%

CW CHART

MIS and skills development

Most survey respondents focus on developing their management, rather than technical, skills



CW CHART: MITCHELL | HAYES

Larry Bell, a senior manager for Quantas Airways, Ltd. in San Bruno, Calif., is frustrated with the demands of his position. As information systems manager for Quantas's North and South American business, he is caught between conflicting needs for his input into management decisions and keeping the corporation's information systems running efficiently.

"I'm a scarce commodity," Bell says. "The executives need me to give them information on how information systems can meet their needs, and I have to keep up with the rest of the world at the same time."

Another of his concerns is the amount of resources Bell says he can deploy to support user departments. "Finance is crying for service, but attention to that area would only save nickels and dimes. Our attention has to go to sales where we can get a high return," he says.

Frustrations aside, however, Bell joins the rest of the respondents in reporting satisfaction with his work.

MIS professionals surveyed also say they are satisfied with the location, reputation and industry of their companies. But sometimes the reputation of the company is cause for concern.

"We're in Chapter 11 bankruptcy reorganization," says Melvin Belt, manager of distributed systems technical support for Manville Corp. in Littleton, Colo., the world's largest manufacturer of asbestos.

Despite the turmoil, which includes a move to a new building, Belt says he likes the variety of responsibility his job offers.

Reorganization at Manville also meant a loss of recognition of the human side, Belt says. "The employees are treated more as numbers. They are not paying attention to them as people, except for the head count," he says.

Almost 60% of the respondents say they set definite career goals, and 12% report that they expect to be in their current positions for the next three years. Of those who plan to move on in the short term, 20% say they expect to attain positions as managers or MIS/DP directors. In 10 years, less than 5% of the professionals respond that they expect to be in their current position; 12% hope to be department, area or group managers.

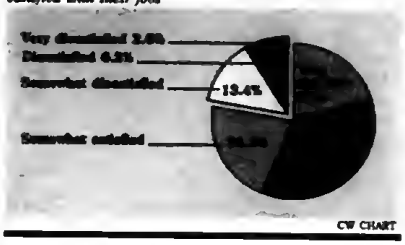
Despite their desire to advance to management positions, the respondents are fairly evenly divided when it comes to focusing on technical vs. management training. More than 52% say they are currently targeting management skills, while 47% say they are primarily acquiring technical skills.

Donald Bears, senior systems programmer at BASF, Inc. in Pinehurst, Mass., is targeting technical training because, he says, he does not want the headaches of management responsibility. "I'm not interested in getting into management. I'm into doing my own thing and not worrying about other people," he says.

On the other hand, Andrew'a Miotti sees benefits in being a manager. "In management, you get more information," he says. "You may hear about things at a nonmanagement level, but they are not explained in detail unless you're a manager."

How satisfied are you?

Out of 605 Computerworld survey respondents, 77.8% are satisfied with their jobs



CW CHART

Elements of a satisfying job

*Variety in work load, salary and opportunity for advancement top survey respondents' list**

	Importance[1]	Satisfaction in current position[2]
Variety of responsibilities	3.38	3.00
Salary	3.25	2.89
Opportunity for advancement	3.21	2.61
Work load	3.06	2.75
Nonmonetary recognition	3.02	2.53
Performance review process	2.95	2.55
Retirement program	2.94	2.77
Reputation of company	2.92	3.08
Location	2.79	3.09
Physical environment/Office	2.78	2.70
Daily commute to work	2.77	3.08
Bonuses	2.42	2.36
Profit sharing	2.38	2.54
Industry of company	2.30	3.13
Child care	1.44	2.62

* Base of 811 respondents
[1] Very important = 4, Important = 3, Somewhat important = 2, Not important = 1
[2] Very satisfied = 4, Satisfied = 3, Dissatisfied = 2, Very dissatisfied = 1

CW CHART

Hopper

FROM PAGE 85

and studied at night for a mathematics degree from the University of Houston. Afterwards, he worked in data processing for Shell's oil exploration operation.

Leroy Drury, now Shell's vice-president of information and computer services, worked with Hopper then. He says Hopper was technically competent but also "well met," with a pleasing personality that made him popular with internal clients. Hopper showed an interest in the business, "striving to use the computer to the most significant advantage to the people he supported," Drury says.

Risking failure

Hopper next moved to Shell's DP operations and corporate DP planning outfit in New York, then returned to Texas in 1967 to join Electronic Data Systems Corp. (EDS) in Dallas. He says he welcomed the more entrepreneurial environment at EDS, feeling Shell would not let him risk failure.

"They weren't going to give you enough rope where you could hang yourself," he says. "At the same time, you couldn't necessarily stretch yourself as much as I felt I wanted to stretch myself at that age. I was willing to take more risk than they were willing to take with me."

> "A LOT of guys are like veneer. Max is solid walling. He looked better every day. Some people never looked better than the day you hired them."
>
> H. ROSS PEROT
> ELECTRONIC DATA SYSTEMS CORP.

In a telephone interview, EDS founder H. Ross Perot said he was impressed with Hopper's background and with his modesty. "He didn't wear it on his sleeve. His record spoke for itself," Perot said.

At EDS, Hopper worked with Blue Cross/Blue Shield of Texas but says he did not find insurance particularly stimulating. He joined a new account with United Airlines and soon took charge of it, helping track aircraft parts and supplies.

When EDS and United Airlines failed to renew their contract, Hopper decided to keep his family in Chicago and joined United Airlines to manage computers in operations.

Perot said that in an industry "where wearing well is everything" and a first impression means nothing, his respect for Hopper kept growing. "A lot of guys are like veneer. Max is solid walling. He looked better every day. Some people never looked better than the day you hired them," Perot said. He also called Hopper an effective leader, "a straight shooter" in dealing with people and a man who generates trust and respect.

Hopper missed a promotion at United Airlines, which he attributes to his failure to promote his accomplishments. He moved back to Texas to join Dallas-based American Airlines in 1972, taking charge of Sabre, which had been used internally since the early 1960s.

Developing the idea with Robert Crandall, now American's chairman and chief executive and at the time its vice-president of marketing, Hopper led the distribution of Sabre terminals to travel agents. The strategy has driven up sales of American tickets and brought the airline a wealth of data on the travel market. It has also generated immense profits from travel agents who use the system and from other airlines whose tickets are sold through it.

Described by some as the world's largest on-line data base, Sabre incorporates nearly 100,000 terminals and printers and can process 1,450 inquiries per second, according to American.

Left for Bankamerica

Hopper was named vice-president of DP and communications services in 1980, but two years later he accepted an offer from Samuel H. Armacost, chief executive of Bankamerica, to move to San Francisco and join the firm as director of retail information and processing services.

Hopper's offer came 11 months after Armacost had taken the top job at the banking company, which was starting to slip from its stature as operator of the largest U.S. commercial bank.

The fall stemmed in part from deregulation, which hit Bankamerica particularly hard because of its heavy reliance on consumer deposits. But the bank was plagued by organizational defects too, including a culture that was both highly bureaucratic and sprawlingly decentralized. The environment fostered loose management of loans, as officers filed overly optimistic reports.

The bank had also slipped from leader to laggard in technology. Despite its reliance on consumer deposits, it was last among the major banks to use automated teller machines and had dozens of incompatible systems.

Hopper helped Armacost revamp the bank's long-range strategy to deal with deregulation. He describes the concept as developing a low-cost means of distributing financial products that would be difficult for competitors to copy. A major thrust was addressing the lack of technology.

Under Hopper, the bank installed more than 1,000 ATMs, centralized check clearing (saving $15 million to $20 million a year, Hopper says) and, in his most ambitious undertaking, expanded the bank's California transaction processing capabilities by converting from IBM's IMS operating system to IBM's TPF, (formerly known as the ACP Transaction Processing System), the high-volume system that had allowed the airline reservation systems to function.

Plans also called for bringing DP and communications into one organization, consolidating the bank's 60 or 70 networks, improving management information and converting to TPF overseas.

But in the midst of such efforts, Hopper says, "we got hammered with the loan loss situation." With its heavy lending to basic industries and California agriculture and real estate concerns, and with the lack of loan controls, the bank was hit harder than most by the disinflation of the early 1980s. "It was almost totally unexpected," Hopper says.

He suggests the poor loan performance stemmed in part from lack of technology but more from the performance of loan officers. "It's their judgments you're trying to gather information on," he said, although "getting those in a consolidated way may not have been as good as we would have liked."

Return to AMR

In January 1985, the year the bank was to fall into the red, Hopper was named executive vice-president for systems engineering and launched a five-year, $5 billion program to expand and integrate. But 10 months later, he abruptly resigned to return to AMR as senior vice-president for information systems.

Hopper says Crandall made a generous offer for him to return to AMR, and the bank made a tempting counteroffer, including the prospect of a pure business role. He denies that disagreements within his organization over the TPF strategy [CW, Nov. 11, 1985] reflected a lack of confidence in him on the part of the bank's management.

The conversion was controversial on several counts. While accommodating high volumes, TPF is a relatively loose operating system, more subject to losing records than others — a much greater concern at a bank than at an airline. The operating system required modifications, which necessitated hiring scarce and expensive TPF programmers. The bank had to recruit programmers from airlines as far away as Australia and New Zealand.

The TPF system was also difficult to integrate with other bank applications. On top of this, the growth in transaction volumes that the operating system was intended to address did not materialize as quickly as projected.

Working 70 to 80 hours a week, *Hopper maintains he enjoys his job, so most of the time, 'it doesn't become an overwhelming burden.'*

'Max the Ax'

An MIS director who worked at Bank of America then says the firm's top management backed Hopper despite grumblings within the organization over the conversion. He adds that the complaints may have been aggravated by a shake-up of the bank's static culture that Hopper was expected to help carry out, including work force reductions that helped earn Hopper the nickname "Max the Ax."

"Some people were in the wrong place at the wrong time. He sure was," said the MIS director. "The problems were the most complex you can imagine in the business."

Hopper says disagreements over strategy were in good faith. "There was no acrimony. They were honest business discussions. Yet they got picked up by people at very low levels, as things are wont to do, as a cause celebre.

"It was far, far from that. In the world that I deal with, there are always multiple ways to solve a problem," Hopper says. "And there are always going to be, I hope, people who are recommending one side vs. another so that you get some contrasting views on how to solve a problem."

Hopper says he agonized over staying with the bank or going back to American. "Texas was home, relatives and friends, kids. On the other hand, I had initiated a lot of things [at Bank of America] that weren't totally through." Ultimately, he says, it seemed American offered a slightly better situation, in part because of the balance between technology and business roles.

Hopper describes his latest position as a three-legged stool. One leg is supporting the airline. A second is operating the Sabre system as an independent business, which Hopper says might generate $100 million in pretax profits this year. The third is trying to generate profits with information technology in various niche markets through AMR Information Services.

AMR is overhauling Sabre to provide users with on-site processing. Earlier this year, the firm significantly extended the system's reach by linking it with the Resana reservation system of All Nippon Airways, Japan's largest domestic airline.

On the other hand, the company watched its rivals get in on the two European reservation systems launched this summer. The European airlines that are running the systems may have been reluctant to work with American because of its strength as a competitor in Europe, according to industry analysts.

Policy-making role

Last year, AMR announced the formation of three Information Services business units, aimed at telemarketing, banking and travel services like hotels and rental cars. Hopper plays a policy-making role in such ventures, maintaining centralized overhead and support for largely autonomous units.

He says his role in these and other endeavors is demanding. Starting up AMR Information Services, which should take two or three more years, requires his 70- to 80-hour work week. The biggest challenge is finding the right people, he says. But he likes the work. "If I didn't enjoy it, it would be a burden, and sometimes it is. But most of the time it's fun doing what I'm doing, so it really doesn't become an overwhelming burden," he says.

Managing information services is not all he thinks about, however. He likes to ski and travel, particularly in the wine country outside San Francisco, where he might want to retire. "I guess my ultimate retirement dream, if I could, is to grow grapes," he says.

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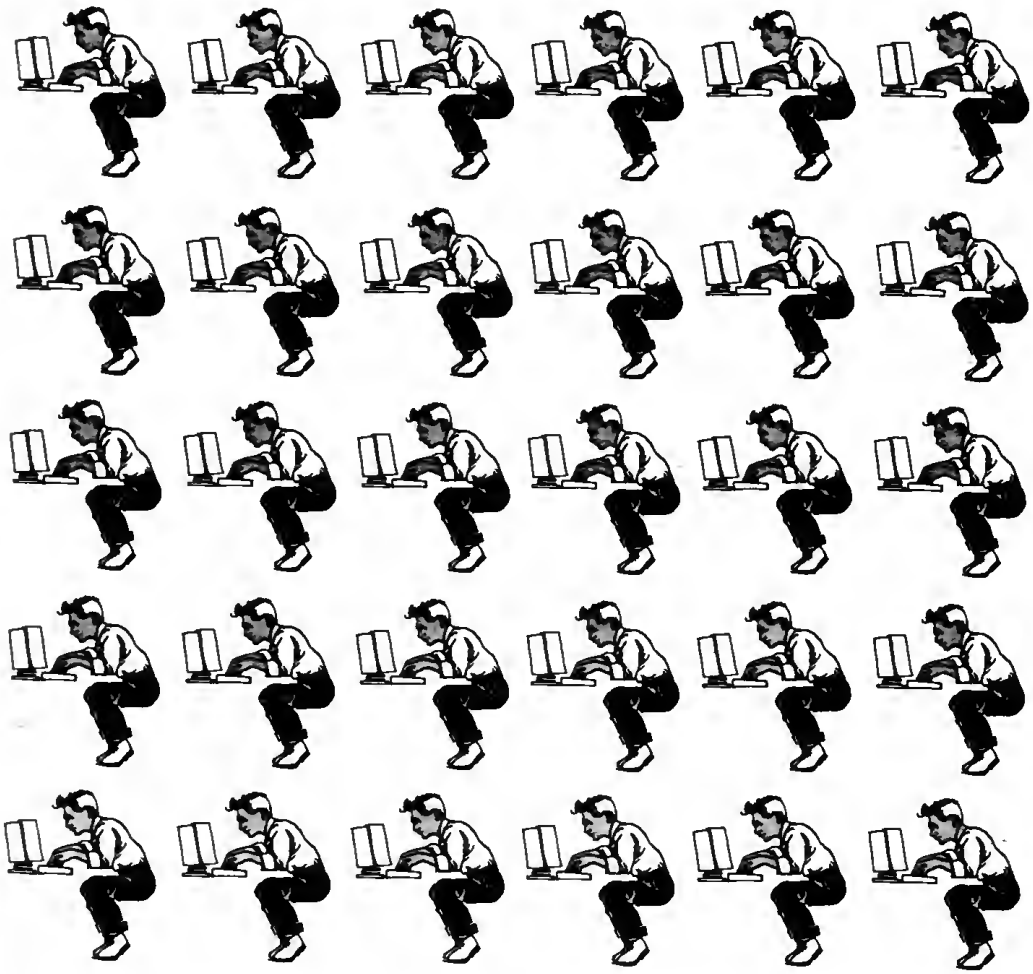

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Five keys

FROM PAGE 85

required skills. Periodic reviews of the staff's technical skills and areas for improvement can often help managers develop refresher courses or advanced training, thereby keeping each employee's technical skills current.

But often overlooked are employees' personal skills. Traits such as creative thinking and leadership will benefit the organization. Every employee could use help in time management, too.

Knowledge. Just as there are two types of skills to consider — technical and personal — there are two types of knowledge to think about: MIS knowledge and business knowledge.

Most MIS managers keep their people up to date regarding MIS knowledge. There are magazines and books to read, classes, seminars and conventions to attend and, of course, good old on-the-job training.

But where most managers fail is in not keeping their people informed about the company and its business. It really shouldn't take much time to hold periodic meetings with employees to talk about the company, its objectives and how it is doing in reaching them.

The more knowledge employees have about their company, the more they will feel a part of it and the more of a personal commitment they will make to its success. They want to feel they've contributed to the success of the company.

Tools. There are numerous tools to consider using in today's fast-paced, high-demand MIS organization, such as fourth-generation language products. When you consider the low cost of hardware compared with the value of employees' time, it makes sense to provide each worker with personal tools.

Are there other tools that should be provided? Some shops maintain a pool of terminals or personal computers in a room where employees can do on-line work. This practice not only boosts efficiency but can also enhance motivation.

Opportunity. If managers want employees to be more productive, they must provide the opportunities. The place to start is by asking employees where and how to do so. This might be done in brief meetings, perhaps over lunch.

Next, the manager must provide the needed resources. Once that's been done, most employees will go all out to make the gains they have indicated are possible.

Motivation. The one factor most likely to help improve productivity is motivation. How do managers motivate MIS employees to make greater gains? And, just as important, how do managers avoid demotivating workers?

The first step is to learn enough about employees to understand what might motivate them, perhaps through a good appraisal and counseling system. If you think money is the primary motivator, you are not as effective a manager as you could be, and you can expect morale and turnover problems.

An occasional walk through the employees' areas, a brief chat or periodic visits with small groups can provide extremely valuable insights into what is going on. This not only results in better informed managers but also shows employees that their managers are caring people. After all, employees are directly motivated by the opinions they hold about their superiors.

As is widely known, salary is not a motivator — at least not for long. But the lack of fair wages is certainly a demotivator.

Managers should spend time analyzing wage scales, comparing them with other groups' salaries both in the company and out of it. It helps when employees know of such studies and feel that managers want to pay them top wages: wages on par with the competition yet within limits that help keep the company in business.

Another motivating factor is a clear growth path for each employee, technical as well as managerial. To many employees, moving up the ladder is obvious evidence to them and to others in the organization that their performance has been recognized as exceptional. The key is to develop rungs on the ladder that allow earned promotions over reasonable intervals.

Finally, spending long hours at the office does not necessarily result in greater productivity. Working smarter and more efficiently will pay off in the long run. Too many hours on the job produce fatigue and reduce employees' effectiveness. It can also hurt family life and limit the time available for staying healthy and vital.

Employees should be encouraged to seek the right balance. They need to know that their managers do not want them at the office all the time. They need to know their managers care about their family lives and good health.

Improvement in staff productivity doesn't happen by accident or because of executive order. It requires planning, organizing, motivating and controlling — the four universally accepted managerial functions.

Gilliam is president of Gilliam Associates, a computer and management consulting firm in Ponca City, Okla.

COMPUTER INDUSTRY

INDUSTRY INSIGHT

Alan Alper

AT&T tries, tries again

Every time you think AT&T is about to withdraw from the computer industry, it introduces some 40-odd new products or enhances existing products. Then the firm pleads with just about anyone who will listen that despite mounting losses, it's in the business for keeps.

That's just what the telecommunications firm did at a recent press conference in Parsippany, N.J. But this time, it was the way AT&T did it that had some observers shaking their heads.

It was only a couple of months ago that the rumor mill spun out of control with indications that AT&T was going to spin off its Data Systems Group into a separate business run by its computer partner, Ing. C. Olivetti & Co. in Italy.

The Parsippany press conference was intended to dispel rumors that AT&T had had it with the computer business.

Interestingly, the event occurred at the midpoint of PC Expo, a major trade show for large corporate purchasing types, which was being held some 40 miles east in a small town called New York.

AT&T contended it called the press to Parsippany, near its systems group's operations center, rather than to its New York headquarters, for a variety of reasons. The primary reason, AT&T spokesmen claimed, was that the Data Systems Group executives needed to be near their offices at that time.

The event points out AT&T's acute inability to cast itself in a favorable light at a time when its computer business is in vital need of a promotional boost.

Staying in the race

Yet despite the lack of coordination, the press conference did, for the moment, set the record straight on AT&T's intention to remain in the computer industry.

Continued on page 103

NET soars in T1 atmosphere

BY KATHY CHIN LEONG
CW STAFF

REDWOOD CITY, Calif. — Praised by the financial community as one of the hottest technology start-ups in years, Network Equipment Technologies Corp. (NET), a provider of high-end T1 multiplexers, is operating at breakneck speed.

In the fiscal year ended March 31, NET posted a 448% increase in annual sales over the previous year, reorganized across the board and clinched a worldwide marketing arrangement with IBM. And that, according to NET executives and industry analysts, is only a glimpse of what is to come.

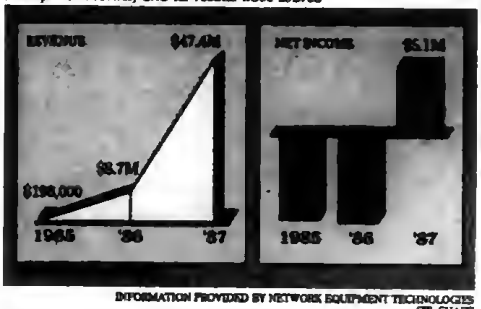
"They're driving 130 miles an hour with the roof pulled down," says Michel Guite, an analyst at Salomon Brothers, Inc.

Sensitive to competitive pressures, NET President Bruce

Continued on page 102

Flying high

Network Equipment Technologies has grabbed 24% of the T1 multiplexer market, and its results have soared



INFORMATION PROVIDED BY NETWORK EQUIPMENT TECHNOLOGIES
CW CHART

Orion expands IBM connectivity line

BY STEPHEN JONES
CW STAFF

BERKELEY, Calif. — Orion Network Systems, Inc., a leading third-party supplier of IBM connectivity software, last week announced that it has acquired Berkeley-based X.Dot Corp. through a stock swap of an undisclosed amount.

With X.Dot, Orion gains a line of software that uses the CCITT X.25 standard protocol to send packets of information over public data networks. The acquisition is intended to round out Orion's line of connectivity products, which allow non-IBM computers to talk with IBM machines by using IBM's Systems Network Architecture (SNA) standard.

Under the agreement, which was privately finalized Sept. 4, X.Dot has been completely merged into Orion.

With a gaggle of small companies specializing in SNA software today, the deal should help Orion broaden its base of opportunity, said David Terrie, president of Boston-based Newport Consulting, which specializes in the networking industry.

Orion currently sells its connectivity packages to companies such as Apple Computer, Inc., AT&T and Italy's Ing. C. Olivetti & Co.

"Having X.25 in their pocket gives them a lot more flexibility as a multiple-product vendor," Terrie said.

Merging technologies

In addition to gaining an immediate jump into the X.25 packet-switching market, Orion's vice-president of sales and marketing James Mullen said Orion will combine X.Dot's technology with its own SNA capabil-

Continued on page 103

Former CMI execs found new firm

BY CLINTON WILDER
CW STAFF

BLOOMFIELD HILLS, Mich. — Four former CMI Corp. executives have quickly formed a computer leasing company to compete with the rival lessor that bought out CMI in a bitterly contested acquisition earlier this year.

The four executives were among several who resigned from CMI after losing a court fight to block the $50 million acquisition of CMI by Continental Information Systems Corp. (CIS) in Syracuse, N.Y. That deal combined two of the U.S.'s largest independent computer lessors into the industry's second largest player. The new firm, named Encore International, Inc., is headed by Lloyd B. Marks, CMI's former senior vice-president of marketing.

Edward Cherney, CMI's former chairman who led the fight against the CIS buy-out, is not involved with Encore.

"I just didn't feel like joining the competition," Marks said. "We felt we could hold the CMI team together and start over."

Marks said Encore will target former CMI leasing accounts and new business.

He said the firm has $70 million in capitalization from employee stock ownership, bank credit lines and an undisclosed venture capitalist.

Maxtor thins its ranks

Layoffs due to shipment delays from supplier

SAN JOSE, Calif. — Maxtor Corp. recently laid off 60 employees because of problems with manufacturing and 5¼-inch hard disk drive shipments.

Maxtor's woes stem from the decline in availability of thin-film read/write heads from its major supplier, Read-Rite Corp. in Milpitas, Calif.

Read-Rite has been experiencing significant manufacturing problems since May, creating severe shipment delays of its heads to Maxtor, Hewlett-Packard Co. and other disk drive makers using the new thin-film disk drive technology.

The staff cutbacks focused on Maxtor's San Jose manufacturing plant and represent approximately 5% of the company's domestic work force.

Approximately half of the layoffs involved temporary employees and did not affect overseas workers.

Although Maxtor could experience reduced revenue of $20 million this year as a result of component delays, the company said it is making headway in developing alternate sources for the read/write heads.

The component shortages are not expected to significantly affect those computer vendors currently using thin-film hard disk drives, analysts said.

HP, for example, which manufacturers its own disks, has previously reported that its systems using thin-film disks are not yet available commercially.

Prime to acquire micro CAD vendor in bid for low end

NATICK, Mass. — Staking a claim in the microcomputer end of computer-aided design (CAD) software, Prime Computer, Inc. last week announced an agreement to acquire Versacad Corp. in Huntington Beach, Calif.

Versacad is the No. 2 vendor of microcomputer CAD programs behind Sausalito, Calif.-based Autodesk, Inc. Privately held Versacad has annual sales of about $6 million.

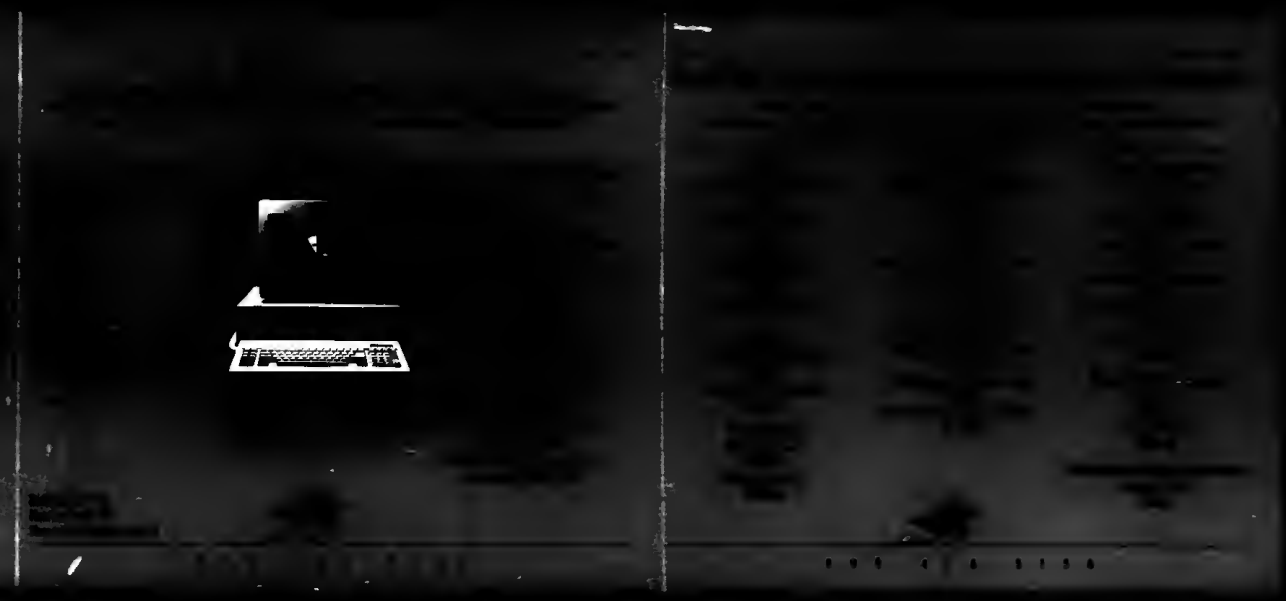
Versacad's products run on IBM and Apple Computer, Inc. micros as well as on Unix-based systems.

The move into the low end of CAD makes sense for Prime, according to Mike Seely, a CAD software analyst for San Jose, Calif.-based Dataquest, Inc.

"A definite segment of the market is interested in PC-based CAD tools," Seely said. "It is an area that will benefit further from the 80386 and other chips to enhance floating-point capabilities and graphics."

Prime recently introduced its own Intel Corp. 80386-based unit, the EXC 360. Versacad can also run on the Sun Microsystems, Inc. low-end workstation that is marketed by Prime.

Although Prime said Versacad will continue to operate independently, Seely speculated that Prime may integrate some of the Versacad product line into Medusa, its flagship software for CAD applications.



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COMPUTER INDUSTRY

MERGERS & ACQUISITIONS

SCI Systems, Inc. announced that it has reached an agreement in principle with **Magnetic Peripherals, Inc.** to acquire substantially all of the operating assets of the latter's Rapid City, S.D., operation. The transaction is projected to be completed by Sept. 30. After the purchase, the Rapid City operation is slated to become a fully integrated manufacturing plant of SCI.

California Micro Devices Corp. announced its $14.5 million cash acquisition of the **Microcircuits Division** of **GTE Communication Systems** based in Tempe, Ariz. The acquisition, which may triple California Micro Devices' current production level to approximately $30 million annually, includes all the Microcircuits Division assets, inventory, receivables, contracts and trade payables in addition to a silicon wafer foundry and test facilities.

Davox Corp. announced its intent to acquire **TBS International, Inc.** in Richardson, Texas, from TBS's sole shareholder in a transaction valued at approximately $12.3 million. Davox is a supplier of computer-aided communications systems. TBS manufactures a family of autodialing systems that complements Davox's existing product line.

Servcom, a division of **Alcatel Information Systems, Inc.**, has reached a definitive agreement with **Executive Computer Maintenance, Inc.** to acquire the latter's field service operation.

Under terms of this agreement, Servcom will acquire all field service-related assets of Executive Computer Maintenance's operation and assume responsibility for providing continuing maintenance, repair and related support services to all of that firm's current customers.

Telos Corp. has signed a letter of intent to acquire privately held **DMA, Inc.** in an exchange of stock valued at approximately $2.1 million. Based in Amery, Wis., DMA operates a depot repair facility for computer hardware and sells computer equipment and related engineering services for major customers nationwide.

DMA was founded in 1976 and had annual revenue in fiscal 1987 of approximately $3 million.

General Automation, Inc. has signed a letter of intent to acquire privately held **Aston Technology Ltd.**, an integrator, marketer and distributor of multiuser business computers and applications solutions and a provider of computer field service for the UK marketplace. Terms were not disclosed.

Aston, founded in 1983, serves vertical market niches, including the legal profession, health care, school and university administrative systems and vehicle fleet management.

Sorbus, Inc., a **Bell Atlantic Corp.** company, has acquired **Jolynne Service Corp.**, a privately held computer maintenance firm. Rockville, Md.-based Jolynne is one of the largest independent national companies specializing in the maintenance of microcomputer and terminal equipment for U.S. government agencies.

For those analyzing developments in the PC industry, Compaq offers an executive summary.

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In the midst of the clamor surrounding the new IBM® PS/2 series of personal computers, one thing is perfectly clear to people who really know PC's. COMPAQ® personal computers still work better. They're faster, more compatible, more expandable, and more flexible to accommodate the advancements so many users demand.

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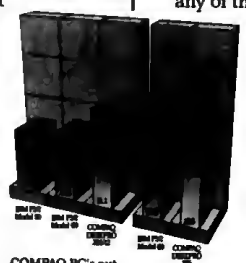

COMPAQ PC's outperform PS/2 PC's in tests for processor speed & disk performance, using the Norton Performance Index Version 4.0.*

Finally, compare portability. You can't. The 12-MHz 80286-based COMPAQ PORTABLE III™ is the undisputed leader. It offers all the functions and performance you'd expect to find in the most advanced desktops. Without any of the compromises you'll find in other portables.

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*Index based on a scale that rates the original IBM PC as 1.00

works better.

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The new MS OS/2 operating system will run on all 80286- and 80386-based COMPAQ personal computers.

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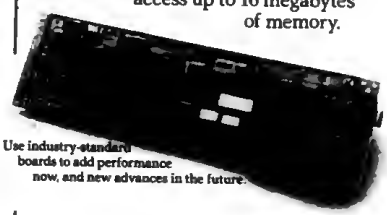

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COMPAQ®

NET

FROM PAGE 95

Smith refuses to let his company rest on its laurels. "Were you ever the passenger of a car that was going so fast around a mountainous trail that you just hoped that there was nothing to block your way on the other side? That's what being in this business is like," he says. "None of us in this market is exactly sure what is around the corner."

Today, all eyes in the T1 market are on NET, which posted $47.4 million in sales for fiscal 1987 ending in March. Although Timeplex, Inc. still holds more than 50% of the T1 market share, according to Framingham, Mass.-based market research firm International Data Corp. (IDC), NET has snapped up 24% of the market in a hurry.

"I've been very impressed with their products and marketing strategy," says Rick Villars, an IDC senior market analyst. "Others have failed to market correctly or have failed to deliver product. They have done both."

Even though IBM's Rolm Corp. subsidiary could potentially come up with a competing T1 product, NET has scored such a sweet multiyear marketing pact with IBM that NET doubts IBM would do anything to compete against itself. The deal specifies that IBM is allowed to use NET protocol technology in future products.

While many other small companies have suffered as a result of alliances with IBM, NET added several clauses to the contract to protect itself, according to Vice-President of Corporate Marketing Tony Russo. One of the clauses indicates that IBM cannot cancel shipments it has ordered.

Crystal ball

NET was formed in 1983 by Smith, Walter Gill and four others after they learned that T1 lines would be available to the general market after the AT&T divestiture. As they predicted, Fortune 500 companies and others were interested in building private T1 networks for long-term cost savings.

To date, NET has installed more than 500 T1 nodes for some 65 customers, including AMR Corp., Merrill Lynch & Co. and Shearson Lehman Brothers, Inc.

Bill Stout, strategic network manager at San Francisco-based Wells Fargo Bank NA, recalls Wells Fargo serving as one of NET's original beta-test sites. "Going with them was the biggest technical risk I ever took," he admits. After a six-month pilot test against a Timeplex multiplexer three years ago, Stout says, the NET IDNX won out due to its greater nodal capacity and flexibility.

While known mainly for the IDNX line, NET is not limited to the T1 market. Whatever devices or services move information is open game as far as Smith is concerned. Last year's buy-out of Santa Barbara, Calif.-based Comdesign, Inc. proved just that. Comdesign makes a variety of low-end data communications products, including X.25 packet-switching gear.

IDNX product manager Lloyd Collins indicates that this year, NET's own product line ventured into the lower end of the market with smaller versions of the IDNX.

No longer considered a small-time start-up company, NET employs 550. The work force is expected to double next year.

The company reorganized in April to prepare for its expansion. Three new product groups were born- one to concentrate on network management, another on the IDNX hardware line, and the third on IDNX-related products and services.

Salomon Brothers' Guite predicts that the 30 or more T1 equipment companies will dwindle down to a handful over the next three to five years. An alliance of T1 companies and vendors could prove to be formidable competition for NET.

But Smith is confident NET will be one of those independent survivors in the T1 shakeout.

"We have a lot to do still, and my attitude is that we haven't done enough for the market yet," he says. "My challenge now is managing this orchestra of players to be so well-tuned that it is not equaled by anyone in Silicon Valley."

AT&T

FROM PAGE 95

As the firm's new high-end 3B4000 multiprocessor and Intel Corp. 80386-based micros suggest, AT&T's woes are not technological.

The Data Systems Group's seemingly intractable problem is selling and marketing its computer products to the data processing and MIS communities.

The systems group'a sales force sells everything from telephones to data communications and telecommunications devices. The formation of a dedicated sales force would help focus the division's efforts at a time when most DP/MIS executives, outside of government and educational institutions, lack the confidence required to buy computers from AT&T.

AT&T'S Data Systems Group's seemingly intractable problem is selling and marketing its computer products to the DP and MIS communities.

The Data Systems Group is making some inroads. The unit recently won a contract to supply McDonald's Corp.'a company-owned stores with its new 386-based micro. The McDonald's contract is estimated by some analysts to be worth about $20 million.

The silver lining

At the press conference, Data Systems Group Senior Vice-President Vittorio Cassoni found a silver lining in the unit'a continuing losses.

Although revenue was flat for the first seven months of the year, the division'a losses were only 45% of year-earlier levels. That puts Cassoni well ahead of AT&T'a corporate goal of cutting red ink for the year by 35% on the estimated $1 billion in losses that the unit had last year.

Many believe that if anyone can turn the Data Systems Group around, it is the charismatic Cassoni. The group'a image problems, however, must be resolved if the ex-Olivetti and IBM executive is to have a chance.

Even so, a turnaround is at least three to five years away, most analysts say. If Cassoni is unsuccessful after that period of time, AT&T may then be willing to spin off the Data Systems Group. But, will Olivetti still be interested?

Alper is *Computerworld's* Mid-Atlantic bureau correspondent.

Orion

FROM PAGE 95

ity to make an integrated package that will feature both protocols.

The product, due out in 1988, would have a common user interface to help convert SNA data into the efficient information packets that are sent over wide-area telephone lines with the X.25 protocol. That would enable IBM machines to talk with other machines via the public data networks used by most of the world's common carriers, such as McDonnell Douglas Systems Co.'a Tymnet, Canada's Datapac and West Germany'a Bundespost.

Other companies offer similar products, but none have completely integrated the two protocols, Mullen claimed.

In an unrelated acquisition of a packet-switching systems manufacturer announced last week, Timeplex, Inc. in Woodcliff Lake, N.J., said it plans to acquire Dallas-based Cygnus Computer Corp. The move would be accomplished by exchanging shares of Timeplex's common stock for all outstanding shares of Cygnus.

Timeplex has exclusively marketed Cygnus'a packet switching software for the X.25 protocol for the last year. The product, which carries the Timeplex label, is currently sold in Europe.

Pending approval of the deal, Cygnus will become the marketing and engineering division of Timeplex and remain in Dallas.

Career fairs tighten standards

Experienced candidates benefit; newcomers, executives look elsewhere

BY MICHAEL BALL
SPECIAL TO CW

Computer career fairs are evolving from wide open company showcases that attract everyone, regardless of skill level, into highly focused events aimed at drawing only qualified candidates.

This trend is good news for MIS professionals still early on in their careers, but job candidates just trying to break into the industry or senior managers looking for high-level positions will probably not find what they are looking for at job fairs.

Companies that participate in the fairs cite two years of professional experience as the minimum qualification for job candidates, and they rarely expect to find executive applicants.

Two-way street

MIS professionals who possess enough experience but are not looking for the highest level jobs can save themselves a great deal of legwork by attending fairs. They facilitate a two-way screening process. Candidates can check out the company, and company representatives can inquire about applicants' experiences without the formality of sit-down interviews.

Employers are attracted to the fairs because of the qualified candidates they promise and because hiring costs are lower for positions filled through the fair than through other means.

"The fairs are very cost-effective programs," Digital Equipment Corp.'s Charles Lufkin says. DEC attends about 50 shows a year run by six different organizers; it has hired as many as 27 people at a single fair.

Some companies say they find they can save even more hiring costs by pooling their resources and holding their own career fairs. The Southwest High Technology Cooperative, a group of companies in the Dallas area, holds four career fairs annually.

"Typically, we look for programmer/analysts with three to six years experience," says Richard Bell, staffing manager for Arthur Young in Dallas and chairman of the cooperative. "Most of our companies have a similar profile. They may look for a project manager but not the senior management level. They definitely aren't looking for entry-level talent; they can get those hires easier in other ways."

Blue Cross and Blue Shield of Texas, Inc. in Dallas, a member of the cooperative, generally sends representatives to shows that prohibit entry-level attendants. "If we are looking for entry-level talent, we go to a different show that allows them in," says Ed Toogood, director of employment.

Firms that run career fairs are not oblivious to such attitudes and are leading the trend toward qualifying candidates.

For example, Software Career Link in Westford, Mass., runs 35 shows a year nationwide and makes a significant qualifying effort. The more rigid qualification process became necessary because of complaints from participating companies, says Software Career Link President Paul Vincent. He says they found long lines of marginally experienced people preventing others from being interviewed.

"Some [attendees] pass themselves off as experienced programmers because they can spell 'Cobol,'" Vincent says.

Vincent notes that the 2½-year experience requirement is a guideline only in the screening process. It is waived for someone with a solid year of Unix, C language or networking experience or with other high-demand skills.

Employers say the most important benefit of job fairs is the reduction in the cost per hire from that charged by recruiting agencies. "The average company hires a little more than two people per show," says Bell, whose cooperative is a nonprofit group and charges a fee for each participating company. "That works out to about $1,000 a person."

Software Career Link's Vincent says he does not view the fairs as replacements for agencies and advertising but rather as "an alternative tool in the recruiting tool kit of our clients."

> EMPLOYERS are attracted to the fairs because of the qualified candidates they promise and because hiring costs are lower for positions filled through the fair than through other means.

Many candidates are reluctant to attend career fairs because they do not want their current employers to know they are seeking a job. "Obviously, if the candidate's employer is going to be there, they have to make a choice," Vincent says. Many candidates review the literature first or call to ask if a particular company will participate. "Those who don't want to come in can send in resumes, but some come in anyway."

Bell says he has noted the same attitude at his group's fairs. He would not name any but said that he knows of some companies that come largely to make sure their employees do not. "But as far as I know, nobody has been fired for coming," he says. "I think it works the other way — the manager finds out they're looking and sees what has to be done to keep them."

'We'll keep you on file'

Many companies say they keep resumes collected from the fairs and refer to them more than those that come in through advertising. Job seekers and employers alike say that hiring someone a year after a fair is not at all unusual.

However, many of the companies with medium-size or small DP and MIS operations go to fairs only when they are ready to hire. In Carrollton, Texas, for example, Computer Language Research/Fast-Tax goes to the local fairs and one regional show to meet immediate needs.

"We're a specialized DP shop and don't look for everyday Cobol talent," says Eddy Guy, staffing manager for Computer Language Research. He says his company wants professionals who have experience in specific IBM mainframe and C language programming.

Ball is a free-lance writer based in Boston.

COMPUTERWORLD

SPOTLIGHT

THE DB2 MARKET

An enormous wave of relational DBMS products and value-added tools is ready to break across the marketplace, largely because of the tidal influence of one IBM product. The question is whether MIS is prepared for the impending flood.

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Staying on top of DB2-inspired relational products will require careful planning. As choices pile up, the stakes get higher.

SURF'S UP AFTER DB2 BREAKER

BY PAUL HESSINGER

TIM LEWIS

DB2 is the whitecap — the most visible and easily tracked portion — of a major wave called relational DBMS, now washing over information systems territory. The strategic impact of IBM's DB2 can be summarized in four main areas: the fostering of broad acceptance for relational data base management systems, reinforcing the value of a data architecture, demonstrating the performance possibilities of relational technology and standardizing on SQL.

Relational DBMSs are now accepted as the primary data management technology for all types of applications. Cooperative processing and shared data applications require a platform with a low level of data granularity — a platform that only relational DBMS can provide, particularly in a heterogeneous, dispersed computing network. The degree to which an installation succeeds with DB2 is in direct correlation with its commitment to a data architecture program. The same holds true for any other relational DBMS.

DB2 is a high-quality DBMS capable of supporting high-volume processing applications. However, a critical caveat is that "high-volume" and "performance" are relative terms. Performance is defined by one computer expert as "a statement of speed at which a computer system works" — rather, the speed at which it might work under certain circumstances, or rather, the speed at which it was rumored to be working at some point in the recent past at an unknown location for which no further evidence is available. The point is that there are no inherent volume or performance constraints in relational technology.

DB2's ultimate legacy will be the standardization on SQL that it has enforced on software technology vendors. Essential to note, however, is that SQL as a standard is no longer an IBM issue. Both the American National Standards Institute (ANSI) and the International Standards Organization (ISO) have embraced it as one of the most meaningful standards they may ever address.

But DB2 is certainly not alone in the relational DBMS marketplace. Cincom Systems, Inc., with Supra, and Cullinet Software, Inc., with IDMS/R and IDMS/SQL, are legitimate contenders to DB2's position on the edge of that wave. Cullinet's direction with IDMS/SQL as a platform for departmental systems gives evidence of a powerful undercurrent to the main relational wave.

Applied Data Research, Inc.'s (ADR) SQL support will be among the most comprehensive and far-reaching announced to date. The firm's three-level SQL strategy includes support of SQL in the nucleus of the Datacom-DB DBMS; as a target protocol for its languages so that they generate SQL calls to the data base; and embedded in the languages themselves, allowing the complete utilization of the supported SQL-based DBMS.

Both Oracle Corp., with Oracle, and Relational Technology, Inc., with Ingres, are delivering the fundamental components of a distributed data base architecture.

These components, in the form of powerful SQL-based tools and networking facilities such as

Hessinger is vice-president of research and technology for Computer Task Group, Inc., a professional service and consulting firm based in Buffalo, N.Y.

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Surf's up

FROM PAGE S1

Relational Technology's Ingres/Star, will enable the initial implementation of shared-data applications operating in a heterogeneous computing environment. Rather than consider these products as competitors with DB2, the pragmatic strategy would blend products that meet an installation's requirements for data integration and sharing.

The relational DBMS marketplace and DB2's sphere of influence are not limited to conventional implementations of relational technology, however. At times, performance is an overriding consideration, and combining high-volume transaction processing and data sharing with existing applications and data bases is not necessary. At these times, Teradata Corp.'s DBC 1012 data base processor and Tandem Computers, Inc.'s Nonstop SQL facility offer strong alternatives to a mainframe-only solution.

While not directly supported by DB2, workstations — such as IBM Personal Computers and the new generation of Personal System/2s and even Apple Computer, Inc.'s high-powered Macintosh family — are also catching the relational wave. IBM's OS/2 Extended Edition will be the basis for the company's distributed relational DBMS strategy. By mid- to late 1988, kernels of DB2/SQL will be present in OS/2 Extended Edition.

Closing the gap

Will IBM provide a complete architecture for data sharing between PS/2s and its 3090s? Eventually, yes. In the interim — realistically, three to five years — vendors are rushing to close the gap in IBM's product offerings.

IBM's relationships with Lotus Development Corp. and Microsoft Corp. are, in all likelihood, frameworks for broader initiatives between the partners. These relationships are also strategic opportunities for each vendor to shed a PC-only image and become a major player in the software industry.

Such an upscale move is not without risk. Microsoft, recognizing that OS/2 Extended Edition is a long-term threat to its expansion strategies, moved quickly to form an alliance with a premier workstation relational DBMS vendor, Sybase, Inc., with Dataserver. And it didn't stop there. An additional partnership with the leading vendor of natural language technology, Natural Language, Inc., with Datatalk, will permit Microsoft to market relatively complete solutions for the workstation environment. One has to believe that Lotus will respond aggressively, though not necessarily immediately, to these moves.

In workstations, Unix remains an important consideration. Unify Corp.'s Unify and Informix Software, Inc.'s Informix-SQL represent strong relational DBMS implementations with SQL capabilities and architectures that leverage the inherent strengths of Unix. If for no other reason, DB2 is important because it has spawned the rapid evolution of these products as well as a dramatic change in users' mentality for deploying them.

Harbor watch

Faced with a growing demand for strategic, mission-critical applications that contribute to competitive advantage for their enterprises, MIS managers are understandably torn between a desire to grab the tide and to wait and see what lies beyond the horizon.

A pause for assessment is a valid response at this point. Even though the rapid acceptance of relational DBMSs has positioned it as the most significant software technology issue for the balance of the 1980s, and even though relational DBMSs and related value-added tools are already proving themselves able to provide an effective software infrastructure for engineering strategic applications, caution is still warranted.

> "I'M NOT sure what a relational DBMS is or why I'd even want one. But then again, I felt the same way about IMS back in 1977."
>
> DP EXECUTIVE

Already, 1987 is being heralded as "the year of distributed data base." There is a danger, however, in overstating the significance of relational technology.

The technology has matured to the point at which it is a viable platform from which to begin implementing a distributed, shared-data strategy in a heterogeneous computing environment. The key point for the pragmatic information systems executive is that relational is first and foremost an information architecture issue. A careful balance between pure business requirements, information technology-based opportunities and an information asset/data resource management philosophy is the architectural implication of "going relational."

Too often, the real meaning of relational DBMS is obscured by the very factors that provide the motivation for implementing it.

"I'm not sure what a relational DBMS is or why I'd even want one," one DP executive observes, "but then again, I felt the same way about IMS back in 1977." Despite this paucity of knowledge, the executive was willing to try relational DBMS as a desperation measure.

"Why can't I implement an integrated set of tools to get full value out of any DBMS?" he laments. "Every new 'wonder tool' I try just seems to add to the automation anarchy I'm trying to overcome. A relational DBMS is my last chance to improve productivity around here."

Unfortunately, the prospects for that gamble succeeding are not very good, given the fact that when questioned about the impact of data-driven design on his methodology, the executive's answer was, "Oh, I'm not concerned about that. We haven't used a system development methodology for years."

Lost at sea

Relational DBMS in general and DB2 in particular have already created a wash of DBMS technology that has cast many MIS organizations afloat in a sea of data-driven systems integration products. A solid planning and implementation framework is important for two reasons: Many of the powerful tools that are currently available are relatively unproven and not particularly well understood, and the learning curve will get steeper as new waves of value-added products begin to pile up during the next two to three years.

The only way organizations can be successful in riding the incoming waves is to carefully create an integrated software infrastructure on top of a relational DBMS that will serve as a dependable flotation device.

Successful, insightful users of relational DBMS have used "going relational" as a catalyst for refining and, in some cases, redefining their entire approach for building and delivering information systems.

These installations are successfully defining migration strategies, but business issues dictate that a cost-effective, low-risk approach must be employed. It is interesting to note that several installations recognized the power of relational DBMSs long before it was a dominant software issue. The experience of one installation offers important insight concerning design implications of relational and, for that matter, other significant software technologies such as computer-aided software engineering (CASE) and expert systems.

In 1976, this installation began moving into IBM's IMS DB/DC from a VSAM environment. As new applications were designed, logical data views were adopted as a "standard." Data administrators (they were not called that then) examined

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A data dictionary, from the ground up

BY WILLIAM PITTERMAN

At Bell Atlantic Corp., a home-grown data dictionary for DB2 has become a valuable information resource, not only for its creators, but for other areas of the network service companies as well.

A series of steps lay behind the decision to develop a dictionary internally. The company realized it needed to standardize on a single data base architecture and selected IBM's DB2 as the data base of choice.

In late 1985, the Financial Systems department of Bell Atlantic took on the task of standardizing the financial systems of each of its four operating companies — New Jersey Bell, Bell of Pennsylvania, Chesapeake and Potomac Telephone Co. and Network Services, Inc. — within a common data base architecture.

Restructuring begins

In January 1986, this project, the Standard Financial Systems (SFS) project, began modeling Bell Atlantic's network services companies to better design the planned data base architecture along functional lines. The business model identified the candidate-subject data bases for the architectural as well as the data needs for each business function performed.

The information collected during the business modeling phase was recorded in several personal computer software packages, one of which was a major PC computer-aided software engineering (CASE) tool with data dictionary functions.

The SFS project management team then conducted an inventory of the applications currently supporting the clients of Financial Systems. The information from the business model was then mapped against these applications to produce an applications directory.

The applications directory helped determine the extent to which the current systems duplicated data needs. This information assisted the planners in identifying the systems rewrite and consolidation requirements the new data base architecture would require.

The information yielded by the business model and applications directory assisted enormously in the strategic and tactical planning phase of the project. The candidate-subject data bases of the business model laid the groundwork for data base development, and the applications directory identified the systems that needed consolidation to achieve system standardization objectives.

The value of the business model and applications directory for the ongoing data base and application development efforts was quickly realized, but the need to include all of this information at one central location did not become apparent until later.

The next phase of the project was logical data base design. Armed with the information identified by the business model and the applications directory, a fully normalized logical data base design was completed. This information, which reflected the necessary data structures and relationships for subject data bases, was recorded in the CASE tool and several other automated and manual documents.

New hire

In December 1986, the decision was made to use DB2 as the data base management system for the SFS project. Previous systems had used IBM's IMS or sequential files; those involved in the decision felt that a modern technology was needed and that they wanted to take advantage of relational technology.

With the known lack of data dictionary functionality for DB2, a further decision was made to develop a customized data dictionary rather than to purchase a generic product. This decision was prompted by two factors.

First, with the anticipated arrival of IBM's repository for DB2 in the near future, the developers wanted to allow for the easiest possible transition. Second, no product offered Bell Atlantic the capabilities it could develop itself.

Because the dictionary would be built in-house, it was determined that no actual limits would be imposed on the scope in terms of the information it would contain. This lack of limits became an asset during the tool's evolution. The dictionary's initial purpose was to act as a basic reporting tool. However, as its developers learned more about the capabilities of DB2, they found it advantageous to incorporate everything they gathered about the project into one central location. The end product

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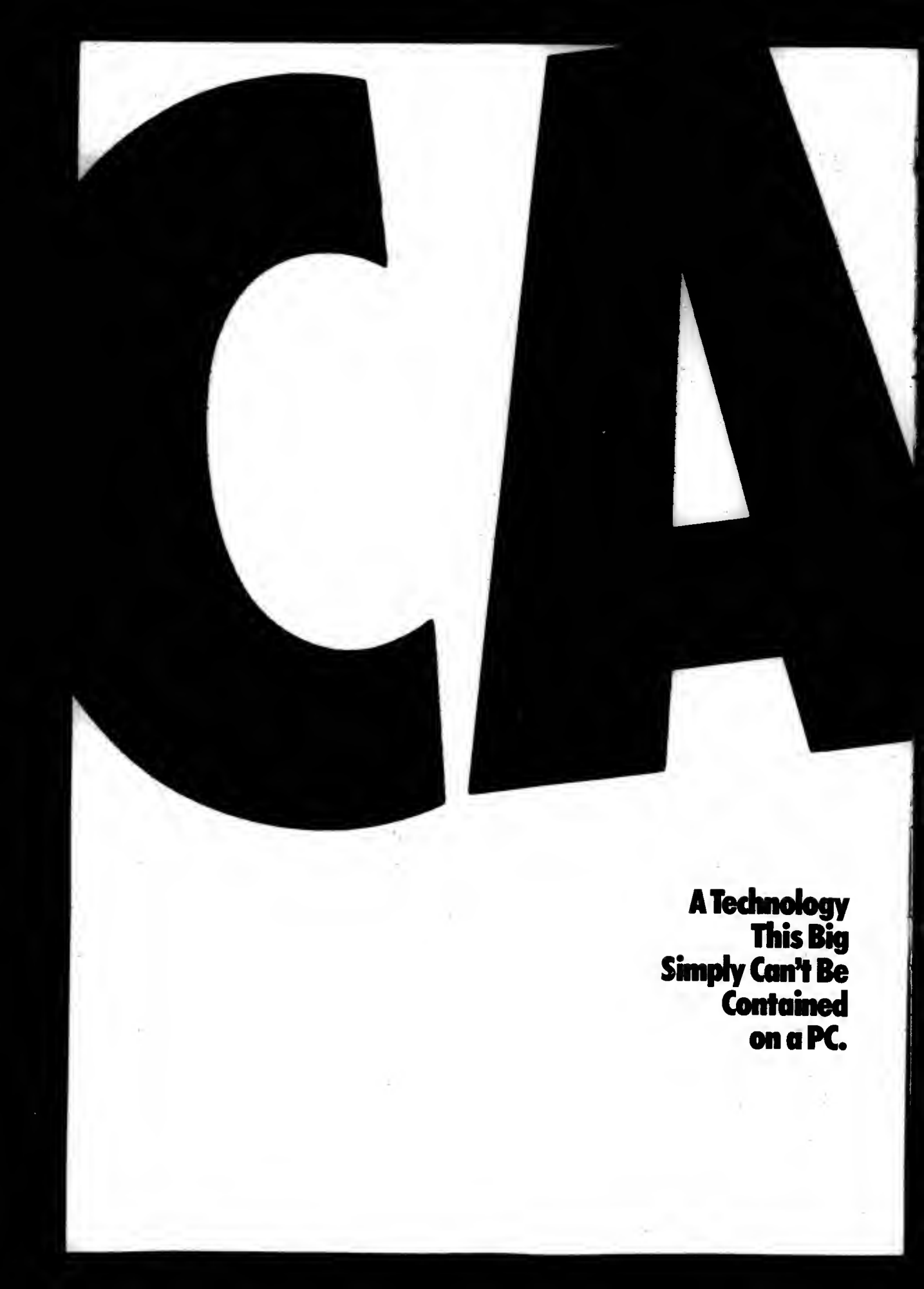
Pitterman is staff manager of data administration for the Standard Financial Systems project at Bell Atlantic Corp. in Freehold, N.J.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Surf's up

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the views and attempted to synthesize them into a composite one that might satisfy multiple applications.

The composite view was then studied with data base administrators. It was their reponsibility to write the data base access code (such as DL/1 calls). Development managers were concerned that the composite views — making extensive use of IMS data structuring facilities — would be too complex for the typical programmer to navigate. The data administrators and the data base administrators pooled their resources to write a common I/O module that handled access to IMS DB data bases and existing VSAM files.

Borrowing from E. F. Codd's work on the relational model, basic verbs were defined for the programming interface (roughly, GET, REPLACE, INSERT and REMOVE). Simply put, until 1983, all applications built used that interface.

During that period, the data administrators continued doing their homework. They came across a paper by Peter Chen titled, "The Entity Relationship Model: Toward a Unified View of Data." This, along with the growing interest in relational, provided an impetus for extending the application-oriented data modeling effort. A prototype of an automated tool was created to define and store logical user views and to transform these views into the necessary code to utilize the common I/O module.

Preserving investments

As managers became interested in relational, generally, and DB2, specifically (circa early 1984), their gravest concern lay in preserving their investment in existing applications and data bases.

To make a long — but successful — story short, the installation's subsequent migration to DB2 has proceeded almost transparently to the development community. To be sure, design personnel have been aggressively trained in relational concepts and in DB2's overall capabilities.

As new applications are considered, the inherent power of a relational environment is being incorporated into the application's design. Functions that previously required significant programming, such as table management, are now being done directly by end users.

The size of the user community for DB2, announced in June 1983, has exceeded even IBM's expectations, amounting to more than 1,800 licenses worldwide as of last June. This estimate is disputed by some analysts because a significant percentage of existing DB2 licenses are said to be "experimental." In fact, fully 30% of current DB2 users are in full production mode, and 45% are applying DB2 as an integrated platform for production and end-user applications. Fifteen percent are employing DB2 for information retrieval and analysis applications.

Many of these last applications are, admittedly, quite basic in nature, but a significant number of end-user applications are, nonetheless, strategic. An interesting avenue being pursued in several installations, for example, is that of integrating two IBM products, Application System (AS) and Professional Office System, with DB2 via SQL/DS for strategic office automation applications.

All told, perhaps 180 DB2 licenses could be classified as truly experimental. Those in charge of these installations would observe, however, that there is no urgency in their use of DB2 as a technology.

Seldom does one IBM employee have lasting impact on both a product's design and its philosophy. The first DB2 product manager, Marilyn Bohl, who left IBM last spring, and other members of the DB2 team, including Norris Vanden Berg, Chris Loosely and George Zagelow, have created a unique product development philosophy based on DB2.

This philosophy hinges on close working relationships with other strategic IBM software units and an almost fanatical commitment to incorporating user requirements both for new functions and enhancements into new releases of DB2 on a timely basis. The philosophy also incorporates a conscious effort to work with other software vendors and consultants so that DB2's capabilities are leveraged and a broad base for defining new features is established.

Bohl's legacy will be perhaps the finest piece of software ever produced by IBM. Of even greater long-term significance, though, will be the pulling together of what had, for years, been competing and often contradictory IBM software tools. "Use-at-your-own-risk" interfaces, without warranties, are now giving way to gradual integration of a select set of strategic IBM products.

Systems Application Architecture (SAA), the logical extension of this gradual integration effort, cannot be dismissed as just another IBM plot. As DB2's influence permeated the IBM organization, the need for more software architectures emerged; hence, SAA was born.

But IBM learned a lesson from its experience with Systems Network Architecture (SNA). The problem with a standard is that everyone can have their own version. IBM's Communication Products Division has broad responsibility within IBM to ensure this does not happen with strategic IBM products.

> FULLY 30% of current DB2 users are in full production mode, and 45% are applying DB2 as an integrated platform for production and end-user applications.

Mirroring the success of this organizational push behind a strategic IBM initiative, IBM recently created the Application Systems Division. This unit will be the flag bearer for SAA as well as the leading edge of IBM's long-awaited foray into applications software. DB2 has proven within IBM that entire families of software tools can be created with the appropriate blend of technology and organizational strategy.

A number of elements in IBM's May 19 relational announcements provide continuing evidence of the "family" strategy. These should not be overlooked in the flurry of interest provoked by the presentation of DB2 Release 3 and the unveiling of the Data Base Relational Application Directory (DBRAD), which is the initial component of the long-awaited repository.

The elements that telegraph that message are tighter integration of the Cross System Product (CSP) set, IBM's primary development technology; a closer coordination of function between SQL/DS and DB2; and the layering of application functions with interfaces between the AS and Query Management Facility. IBM also continues to enhance Host Data Base View (HDBV) as an enabling agent for mainframe-to-PC data transfer.

The strategic significance of DBRAD should not be overstated, however. It is a small, perhaps disposable, piece of technology. It does have value, but, in all candor, any installation that has already embraced DB2 probably has built such a capability without IBM's assistance.

Missing link

The dictionary aspect of IBM's DB2 strategy remains perplexing. In an SAA context, the May announcement clearly establishes DB2 and SQL/DS as mainframe relational DBMS platforms for SAA-based development — which comes as no real surprise. At the workstation level, OS/2 Extended Edition's debut clearly indicates that IBM wants to control the upper and lower layers of a computing hierarchy.

Also, IBM announced a VSAM/Transparency feature, which was produced by a European software firm specializing in migration facilities. In all likelihood, this is the beginning of a migration effort by IBM to move the vast majority of corporate mainframe data under DB2's control. An IMS/Transparency feature cannot be far behind.

While making a statement of intent to provide a System/36 SAA relational DBMS, IBM's failure to announce what that product will be keeps its mid-range strategy in disarray. It was probably the most disappointing aspect of the latest growth in IBM's relational family.

Missing from initial discussions of this distributed relational DBMS strategy was a definitive statement of the relational DBMS for System/36s and 38s and any hint of resolution to the System/36 and 38 dilemma that IBM and users of these machines face: What will the new departmental system be? The 9370? High-end PS/2 models? What will it be called? System/74? System/37.5?

Detractors are quick to point out that IBM has not really solved the dual-DBMS dilemma, as the venerable IMS continues to evolve (even if it is into a carefully constructed niche). Relational experts like Codd continue to belittle IBM's efforts in this regard. They suggest that IMS must once and for all be put to rest, showing their pronounced insensitivity to the challenge large IMS installations face in migrating away from IMS.

> IBM LEARNED a lesson from its experience with SNA. The problem with a standard is that everyone can have their own version.

As installations analyze their "as-is" and "to-be" application portfolios, new opportunities arise because of relational technology's power. However, old opportunities that were satisfactorily addressed by IMS continue to define a role for that technology. Do the relational gurus believe IBM is unnecessarily propogating the IMS technology?

There is also continued emphasis by relational experts on IBM's failure to provide referential integrity in DB2. However, an industry survey of 80 of the largest active DB2 users revealed a 100% consistent, high-priority requirement for IBM's description of — implicitly, a commitment to — its distributed relational DBMS plan.

This requirement, which was expressed to IBM during the last six to nine months, indicates that the growing emphasis on distributed data base systems, distributed data base technology and referential integrity, domain support and foreign key support are not important if users do not know how to proceed with design for cooperative and distributed systems that will emanate from a DB2 mainframe platform in which the aforementioned features are obviously essential. It is a matter of sequencing technology development. Some, if not many, users do not apparently agree in total with the experts. It is this heavily IMS-oriented user base that is behind some of IBM's DB2 direction.

Missing the point

On a one-for-one basis, competing tool vendors such as Sage Software, Inc. (APS Development Center), CGI Systems, Inc. (Pacbase), Information Builders, Inc. (Focus), Artificial Intelligence Corp. (Intellect) and Micro Decisionware, Inc. (PC/SQL-Link) are correct in their assertion of superior function, compared with those IBM offerings.

But such a comparison misses the point, which is that there is room for an extended family of applications and tools built on a DB2 foundation. Users of products from vendors such as Management Science America, Inc. (MSA) and Pansophic Systems, Inc. can attest to that.

It is Pansophic, after all, that offers what is arguably the industry's best generator for DB2 with its product Telon, as well as the best strategy for tool integration and DB2 leverage with Pan/RD. Simply put, DB2's family can be an extremely hospitable application development and information processing environment.

An ideal configuration of value-added products for a DB2 environment would include the following:

- An application generator (be it APS Development Center, Pacbase, Telon or Transform Logic Corp.'s Transform/DB2).
- An "information generator" (Focus, On-Line Software International, Inc.'s Ramis, AS) or two (Intellect or MSA's Information Expert).
- A platform for departmental applications (like Ingres or Oracle) resting on an architecture for distributed data base with appropriate workstation support and networking facilities.
- An inference-based development tool for the construction of expert systems with direct relational DBMS interfaces. Aion Corp. is clearly the leading supplier of such technology. However, several other AI vendors — the most prominent of which are

AI Corp. with KBMS and Teknowledge, Inc. with Copernicus — are moving rapidly with development efforts for products aimed at the mainstream IBM mainframe environment.

CASE tools (depending on whose definition you abide by — some, if not all, of the above vendors might claim inclusion in this category) are an emerging component of relational-based software infrastructure.

Other prominent DBMS vendors like ADR and Software AG of North America, Inc. may find new, highly profitable directions in which to proceed, with the extremely powerful application development tools Ideal and Natural2, respectively. While not a trivial undertaking, each vendor can and should address the hunger for DB2 development tools with DB2 versions of these products. They represent two of the best application development system architectures available today.

In fact, ADR has recently announced its commitment to deliver Ideal for the DB2 environment. With this announcement, the company has indicated there will be a tight coupling between Ideal and the DB2 system, in general, and the DB2 catalog, specifically. Ideal accesses the DB2 catalog for all view and table descriptions and fully integrates this information with its own active application dictionary. In addition, the Ideal language allows use of either its own high-level data manipulation langugage or embedded SQL.

ROME wasn't built in a day, and neither will your integrated relational data resource.

Data architecture

Another dimension of "going relational" is the adoption of architecture-oriented systems planning and design methods that facilitate integration and leverage the shared data potential of a relational DBMS.

The ultimate objective of a data architecture is a comprehensive inventory of the data that is important to a business, along with a consistent definition of the meanings of data and the business rules that govern their interrelationships. The data architecture must support an application architecture that provides the business process view of an application's data needs and a perspective for determining an application's interrelationships with other applications so that data sharing requirements can be identified.

A data-oriented application design methodology implemented in the broader context of architecture facilitates the incremental definition of a conceptual corporate data resource. As applications are implemented, an application project's data model provides the logical requirements for shared data. These may be satisfied via a physical component of the ultimate integrated data base.

Possibly a file interface and file migration tactic may be employed, the point being that even if storage redundancy is being propagated, an organization's data architects are aware of the situation and will incorporate the elimination of the duplication at an appropriate point in the application development sequence.

Rome wasn't built in a day, and neither will your integrated relational data resource. As technology for distributed access to that resource continues to emerge, the need for a comprehensive data architecture becomes more critical.

The conceptual dimension of the data architecture facilitates application planning in a distributed data environment. The logical dimension provides the basis for designing the data bases for individual applications within a shared data context. At some point, of course, we get to the physical issue of actually implementing applications and data bases.

The final component of an information architecture is a system architecture that provides a definition of the configuration of processor, storage and communications technologies for an enterprise. This, in turn, provides the technology perspective of where data is used and how it flows within an organization. This perspective is essential for an organization committed to integrated applications with distributed data base support.

The overall information architecture enables better planning of information needs and the resources (data and technology) required to address those needs. Within the system architecture, a software infrastructure can be established.

Going relational

There is growing evidence that this infrastructure must be based on relational technology so that both top-down and bottom-up approaches can be fully integrated. The reason the infrastructure is so important is because another enormous wave of technology is surely just beyond the horizon.

Codd's model explicitly defines 12 basic, three critical integrity and various structural and manipulative rules for defining, accessing and managing data consistent with the basic definition of the relational model. These rules provide an effective means of evaluating relational DBMS. They are also the source of some controversy.

The unfortunate aspect of Codd's fidelity rating is that be elected to retroactively apply the rules to products — such as ADR's Datacom/DB and Cullinet's IDMS/R — that may have taken marketing liberties with the relational concept. But the vendors that were poorly rated by

by Codd nonetheless offered effective infrastructure solutions. The controversy will not go away unless Codd consistently applies his rating scheme. His original rating of Cullinet's IDMS/R, for example, created unnecessary confusion on the context of the transition to relational systems.

There is no single, universally accepted definition of relational, but, strictly speaking, one is probably not really needed and might even get in the way as users venture into the software marketplace in search of a practical implementation.

The level of abstraction inherent in the relational model is both a blessing and a curse, especially in the pursuit of tools. Many users will say, "Forget the ton of abstraction. I need an ounce of application." This is quite appropriate, since this is a new technology that requires a significant investment and a transition to a different application design mentality.

Without that transition, the inherent power of the model's emphasis on data will prevent an installation from maximizing its return on an investment in a relational DBMS. Relational is the key software technology strategy issue for MIS organizations to deal with. But a single, universally accepted definition of relational is not a fundamental requirement.

Swatting myths

C. J. Date, an associate of Codd's, points out a significant number of relational myths. These, of course, extend to the tools that will be implemented on top of a relational DBMS.

One of the most important, and apparently contradictory, myths is the notion that, unless data is physically stored in tables or flat files, the system managing such storage cannot be relational. In fact, one of the most important attributes of relational is that we view data as if it were stored as tables, whether or not it is. This maintains consistency throughout the various stages of an application's design. Moreover, it facilitates a shared-data perspective when multiple applications are being considered and when data distribution is required.

THE LEVEL of abstraction in the relational model is both a blessing and a curse. Many users will say, 'Forget the ton of abstraction. I need an ounce of application.'

As Date points out in refuting this particular myth, a system can be relational as long as it adheres to "the spirit, if not the letter, of the law." Value-added tools must provide the business user with the ability to view data "conceptually" as tables. If required data is not under the direct control of a relational DBMS, then the logical view of that data must incorporate a "transformation" of data from its native physical format to the relational (tabular) view of the user.

Structured Query Language (SQL) is a direct outgrowth of Codd's relational model. It is not in and of itself a "tool," and yet it presents tremendous productivity potential. It is a language for much more than structured queries.

One relational DBMS vendor recently commented that SQL has real problems in that it is "semantically impoverished" and "nonorthogonal." SQL is clearly not a panacea, but the latter arguments are irrelevant and will hurt the vendors that resist accepting SQL for what it is.

As it was first implemented in the Oracle technology, then in IBM's SQL/DS and later in DB2, SQL has a proven track record as a data definition language for creating views and tables; as a data manipulation language for selecting, updating, inserting and deleting data within tables and views; and as a data control language for controlling access to data.

DB2 is important both for its own sake as a high-quality DBMS that is capable of supporting volume-processing applications and for the influence it has exerted on software technology vendors in terms of standardization on SQL. Making SQL a standard is no longer "an IBM issue," since both ANSI and ISO have now embraced it as such.

SQL is perhaps the major bottom-up consideration when implementing a relational DBMS, because it provides a consistent interface layer between tools and relational DBMS. Simply put, if a software product does not offer an SQL capability today or if the vendor lacks a coherent, comprehensive definition of how SQL will be supported, then that product should not be considered an implementation tool. Far from indicating "submission to IBM," adopting SQL is one of the best ways for a vendor to ensure the long-term viability of its product and the tool's ability to adapt to various hardware and software environments.

SQL has the added value of giving an application access to multiple DBMSs as more DBMS vendors incorporate SQL into the data definition and manipulation facilities. SQL can be implemented in a transparent fashion so users and their tools do not interact directly with SQL but do so through a form of translation.

Take it from the top

In addition to bottom-up application and information generator tools, there is a need for tools that assist in the top-down definition of a data architecture, starting from the conceptual and logical levels.

At the conceptual level, the focus is on the basic data of an enterprise and the rules that govern the processing of that data and its interrelationships.

The logical layer of a data architecture presents that data using the tabular data structure. The simplicity of tables hides the technical details of navigation links and access paths so that the business meaning of the data is not obscured during analysis and design.

There is also a need for tools and methods that define a corresponding application architecture, that is, a process orientation.

The relational model, if it is being viewed as more than a specification for relational DBMS technology, is a powerful catalyst in this regard. Entity relationship modeling methods approach the definition of tabular data structures from a business information perspective. The relational model provides the rules for

Continued on next page

From rich soil, secondary crop springs eternal

BY WILLIAM INMON

Like the dandelions in springtime, it's a sure bet that when IBM creates a marketplace, secondary products will rise up to complement and enhance it. DB2 is no exception to this phenomenon — in fact, it has spawned quite a vigorous and varied secondary marketplace.

What follows is a sampling of some of the more innovative products that have sprung up in this area.

PC/SQL. Although DB2 is not known as a personal computer product, PC/SQL, from Micro Decisionware, Inc., is known as a DB2 PC product. PC/SQL will allow end users to access DB2 data with the comfort and security of their PCs.

PC/SQL allows the end user to format the DB2 request on a PC through a series of menus. Once the request has been formatted, the end user initintes activity that links the PC to DB2. The request, looking like any other DB2 request, is then submitted to DB2.

The end user may either remain linked to the mainframe while the request is executing or may choose to sever the link. If the link is still active, once the request finishes execution, the result of the request is sent to the end user. If not, the results of the query are held until the link is reactivated.

Upon receiving the results of the request, the PC/SQL user can format the output into the desired format, such as Lotus Development Corp.'s 1-2-3.

DB2 Toolkit. Everybody talks about DB2 performance, but nobody does anything about it — except for Innovative DP Designs, Inc., which has produced the DB2 Toolkit for managing DB2 at the system level. Other systems software — including IBM's — offer a few of the features found in the tool kit, but no company offers the complete, integrated, sophisticated tools found here.

The tool kit contains standard tools such as a catalog organizer, a performance analyzer and a table space analyzer. In addition to integrating the full set of tools, another interesting feature of the product is its ability to look at table space data and statistics on-line. Unlike other monitors that produce statistics in a batch mode, DB2 Toolkit can be used dynamically. Analytical as well as early warning data is provided.

Other tools include a table copier, a table extractor and a table space organizer. A powerful feature of the table space extractor is its ability to efficiently unload and reload data. Using the extractor, users can reconvert data between a relational and other formats.

Perhaps the most intriguing feature of the DB2 Toolkit is the table space surgeon. Using the surgeon, rows and columns in DB2 table spaces can be displayed and modified. Bad control information and other integrity errors

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Inmon is a senior principal with American Management Systems in Lakewood, Colo., and an author on the subject of data base design.

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transforming the conceptual view of an application into a logical design that can take full advantage of relational DBMS and bring about massive productivity gains at application development time.

CASE tools are rapidly evolving to support these top-down requirements. Of particular note would be the "methodware" approach embodied in D. Appleton & Co.'s Data Resource Leverage and in Texas Instruments, Inc.'s Information Engineering Facility (IEF). There are many other effective CASE tools that have varying degrees of top-down and bottom-up application life cyle support, such as Knowledgeware, Inc.'s Information Engineering Workbench (IEW), CGI's Pacbase and Intech's Excelerator.

D. Appleton's Leverage provides techniques for modeling activities, or processing, as well as data. With effective task management guidelines, Leverage provides an effective top-down method for establishing an architecture.

Further, using a variation of Chen's entity relationship modeling method, Leverage provides an Activity and Structural Modeling Language that is used to define entities and relationships to a mainframe glossary. From the glossary, user views can be composed, analyzed, synthesized and, finally, transformed into a relational DBMS's view. Leverage's underlying software technology, Janus, translates what are, effectively, entity relationship models into SQL Create statements, which can then be loaded directly into DB2's catalog.

TI's IEF also offers effective planning tools and provides a unique feature in today's CASE market in the form of a DB2-based "encyclopedia." This facilitates design and development efforts using other features of IEF.

The encyclopedia is important for the "horizontal" integration of existing and planned components of IEF that address all aspects of an application's life cycle. It is also key as software vendors or other organizations, such as Pansophic with Telon, consider "vertical" integration between existing components of IEF, screen and data base design facilities and other products that will generate application code and handle basic DBMS functions. The mainframe facility is also important for large projects in which sharing of application design data is a key productivity improvement mechanism.

Other CASE products will move in similar directions. Vendors such as Intech are sure to succeed with the open-architecture strategy for Excelerator. That product, which has a consistent track record of impressive productivity gains for analysis and design tasks, also raises a key relational DBMS implementation issue.

Part of going relational involves a transition to a data-oriented design methodology. Embedded methodology can be seen in two lights with products like Knowledgeware's IEW and TI's IEF.

The good news is that the adoption of these tools mandates the parallel adoption of the information engineering methods that are literally embedded in the respective products' components. The bad news, which then becomes a boon for sales of a "methodology-neutral" product like Excelerator, is that an installation may already have implemented effective data-driven design methods that may not be compliant with the rigor of IEW's or IEF's techniques.

On the horizon

This brings us to the question of what the immediate future looks like in terms of user expectation and vendor response.

In addition to the basic prescribed tenets of the relational model and the explicit recognition of the need for tools to leverage a relational DBMS, there are three key issues that can be identified as user design implications and vendor requirements in the value-added relational DBMS software marketplace:

- Adherence to SQL as the de facto industry standard for data access.
- The need for a relational DBMS-supported repository to support application development and information retrieval tools as well as information planning and application design tools.
- Support for applications operating in distributed and intelligent workstation environments.

Date's recent tutorial on distributed data base is an excellent statement on conceptual rules for creating a distributed data base environment. The rules reinforce the above three issues. Vendors must respond to the rules, not for fidelity's sake but because they represent what users want.

The repository issue has, thus far, remained in the realm of vaporware. IBM's discussion of a DB2-based system repository has resulted in several misconceptions. The first is that the repository, and hence DB2, will be mandatory in an MVS environment. A second is that it will be the mechanism for merging IMS and DB2 data. Still another is that the repository is just a fancy name for the missing data dictionary.

> IBM's frequent discussion of a DB2-based system repository has resulted in several misconceptions. One is that the repository is just a fancy name for the missing data dictionary.

The first and second points, as stated, are complete distortions. The third point holds some validity, but the repository issue is more than a data dictionary issue.

The current focus on a repository deals with the growing need for a user-oriented dictionary/directory of data, or metadata, about the information and applications that are available in a systems environment.

One major bank, for example, experienced tremendous benefits from going relational by taking the metadata gathered in comprehensive data modeling projects and storing it in DB2. Users were then taught the basics of SQL and allowed to access the metadata stored in DB2 in order to satisfy queries concerning what data was available and who owned it. As information retrieval tools such as Focus were introduced and as DB2 data bases of business data were constructed, tremendous productivity gains were realized by users' being able to help themselves to their data.

An application generator was also introduced, and programmers found that data structures required by an application could also be determined by referencing DB2's repository. The generator, once a view was defined, could automatically produce the required SQL statements. The generator houses a catalog in which application data views can be stored for reuse should developers encounter similar data requirements.

Both a global repository and a tool-specific, local repository are important. A relational DBMS provides the ideal mechanism for the former, while individual tools will increasingly reflect the need to support the applications and data within their sphere of influence via a localized directory/dictionary facility. The functionality and complexity of such a repository will vary in direct correlation with the functionality of the tool in question.

> ALL the trumpeting about 1987's being "the year of distributed data base" is premature. A better way of looking at it would be as the year of planning for distributed data bases.

In terms of a common layer between global and local repositories, SQL is the obvious product for the physical layer of data definition. The conceptual and logical layers of interface between multiple dictionaries are not, however, as clearly defined.

A very significant standards effort is under way concerning a repository. The ANSI group focusing on this issue published a draft standard for an Information Resource Dictionary System (IRDS). Not directly connected to relational DBMS or the SQL issues, this potential standard may be the furthest reaching of any such effort. If accepted, IRDS-based dictionaries such as Pansophic's Pan/RD, which is still under development, would enable users to share common applications and data definitions across heterogeneous computing environments.

The ability of a tool to operate in a distributed environment is also critical, although all the trumpeting about 1987's being "the year of distributed data base" is probably premature. A better way of looking at 1987 would be as the year of planning for distributed data bases and the implementation of relational DBMSs.

Practical implementation of relational begins with the realization that information management is, first and foremost, a data architecture and design issue. But if systems builders attempt to ride the relational wave as an implementation-only panacea, then relational DBMSs will be lost in the same turbulent waters that swallowed up the riders of the first wave of DBMS technology. •

Ground up

CONTINUED FROM PAGE S3

was a dictionary that served a variety of needs, from business modeling through application development.

The data dictionary began merely as a vehicle to aid in physical data base design and applications development by providing numerous cross-reference reports about the various DB2 objects and programs that used them. In four months, the data base structure for the dictionary was complete, and the initial cross-reference reports were produced.

Many of the people responsible for the logical data base design also took part in the physical design. As a matter of convenience, the information of the logical data base design was integrated into the customized data dictionary, extending its functionality. Once this was done, the data that had been recorded in several different places was consolidated. Comparison between logical data base design and physical implementation was now merely a report request away.

The idea of integrating more information into the data dictionary was then taken further. The locally developed PC application that stored the applications directory was replicated with DB2 and the information it contained integrated into the data dictionary. This gave the dictionary the ability to report information at the application level.

> COMPARISONS between logical design and physical implementation were now merely a report request away.

The integration of this information, as was true throughout the entire project, proved an invaluable resource in assisting system consolidation and the development planning efforts of the application development teams working to standardize the Financial Systems.

The last step was to include the business model information in the data dictionary. Data structures for the business information were designed and incorporated. With this information, the data dictionary could be used as a tool for the future strategic planning efforts of other divisions within Bell Atlantic whose corporate philosophy was closely aligned with that of Financial Systems.

The customized data dictionary of the SFS project became a complete, highly flexible reference resource that used the DB2 catalog information and integrated it with Bell Atlantic's business objectives and information. The resulting dictionary redefined the scope of the classic data dictionary and dramatically extended its functionality by integrating the business and application information with the metadata of the data base into one central repository. •

From rich soil

CONTINUED FROM PAGE S8

may be corrected using this feature. In the ISPF mode, full-screen display and modification of DB2 tables (such as table "zapping") can be done.

DB2 Alter. One of the most useful products in the secondary DB2 arena is DB2 Alter from BMC Software, Inc. DB2 Alter solves a problem peculiar to DB2 in an efficient and elegant way: It provides the means to automate the alteration of a DB2 data base.

A mature DB2 environment is likely to be thick with tables, plans, views and other data elements. Consider the work required to make a simple change to the table, such as adding a column. Under standard operating procedures, the table must be dropped, the change made to the table and the table restored.

When there are many plans, views and so forth, these procedures become more complex, inviting errors. The errors ultimately show up as tables that are disabled from operation.

When BMC's DB2 Alter is used, the entire process of table dropping and restoration is automated, simplifying the data administrator's job. Even more important, the chances of errors occurring are greatly reduced.

Crystal DB2. System software is not the only area in which the performance issue of DB2 is being addressed. What if you want to size your systems before you build them? You can have your cards read, consult an oracle, or you can use Crystal DB2, from BGS Systems, Inc.

With Crystal DB2, you feed system operating characteristics into the software before you build the system, and Crystal DB2 will tell you what kind of machine resources you will need.

If it turns out that the DB2 application will be a burden on resources, you can alter your design before committing it to code. Then you can ask Crystal DB2 once again what your utilization is going to be.

An interesting aspect of the secondary marketplace for DB2 tools is the speed with which it has grown. For other major IBM products, such as IMS, the secondary marketplace grew over the course of a decade and a half. But for DB2, which realistically has shown a commercial presence for a relatively short time, the marketplace has grown with blinding speed.

It is predictable that, as DB2 matures in its usage as a product, more secondary products will arise. The products mentioned here are only harbingers of what is to come. •

National Database and 4th/5th Generation Language Symposium

DALLAS, NOVEMBER 16–18, 1987

BOSTON, NOVEMBER 30–DECEMBER 2, 1987

PRODUCT PRESENTATIONS

Over 50 Hours of In-Depth Product Presentations

SPEAKERS:

- George Schussel
- James Davey
- Ken Orr
- Larry Ellison
- Al Case
- Vaughan Merlyn
- Larry DeBoever

SYMPOSIUM CHAIRMAN:
Dr. George Schussel

Dr. George Schussel, President, Digital Consulting, Inc. is one of the best known and most widely respected lecturers on DBMS and 4th Generation Languages.

Dr. Schussel will lead the Symposium with the expertise and experience which prompted ICP INTERFACE MAGAZINE to call him the "Guru of Data Base Management."

Dr. Schussel created the symposium to provide a forum for decision-makers to make objective comparisons among products and keep up with changes in the software field.

TOPICS:

- Computer Aided Software Engineering (CASE)
- Relational DBMS
- Distributed DBMS
- Prototyping
- AI/Expert Systems
- 4th Generation Languages (4GL)
- The 5th Generation of Software

FREE

A Two-Day Relational DBMS Seminar.
See page 7 for details.

Feature Article Pages 4–5

A Digital Consulting, Inc. Conference©

DAY ONE

MORNING SEMINAR

George Schussel, President and founder of Digital Consulting, Inc., and James Davey, DCI's Senior Consultant, present a combined seminar program on DAY ONE of DB 4th/5th GL. This interactive, fast-paced presentation features multiple projectors and screens and communicates an enormous amount of technical and management information within a one-day period. In the morning, you will learn all of the major 4th generation concepts. In the afternoon the discussion will move to a review of the software marketplace, the positioning of different software vendors and a comparison of DBMS and 4th & 5th GL products. The advantages and disadvantages of using each company's products will be covered

DR. GEORGE SCHUSSEL
SYMPOSIUM CHAIRMAN

Dr. George Schussel, President, Digital Consulting, Inc., is one of the best known and most highly respected lecturers on DBMS and 4th Generation Languages. He received his doctoral degree from Harvard Business School, is a Fellow of the AAAS, holds the CDP, and is on the editorial board of several publications. Dr. Schussel will lead the Symposium with the expertise and experience which prompted ICP Interface Magazine to call him the "Guru of Data Base Management"

JAMES H. DAVEY

Jim Davey is Senior Consultant with Digital Consulting, Inc., specializing in database management systems, logical database design, 4th generation languages and structured analysis and design. He has twenty years of experience in design and implementation of database systems. Before joining DCI, Mr. Davey was Senior Database Consultant with Eastern Technical Associates, Manager of Product Support and Assessment for Prime Computer and Database and Software Support Specialist for Honeywell and General Electric.

SEMINAR OUTLINE

1. **4th Generation Concepts**
   - a. Technical concepts
   - b. Management issues
2. **Fifth Generation Software**
   - a. Expert Systems
   - b. DRDBMS
   - c. CASE Tools
3. **CASE**
   - a. Graphical programming languages
   - b. Repository
   - c. Code generation
   - d. Limitations
4. **A Tutorial on Relational DBMSs**
   - a. Structure
     - -Tables
     - -Normalization
     - -Views
   - b. Integrity
     - -Entity integrity
     - -Referential integrity
     - -Database specific integrity
   - c. Manipulation
     - -Relational algebra
     - -SQL
5. **Relational Integrity**
   - a. Entity integrity
   - b. Referential integrity
   - c. Database specific integrity
6. **The Management Implications of Using Relational Databases**
   - a. Higher productivity
   - b. More data independence
   - c. Better integrity
   - d. Better performance in certain conditions
7. **The Truth About the Relational "Performance" Problem**
8. **What Are "Born-Again" Relational DBMSs?**
9. **SQL—The New Standout**
   - a. Network data language
   - b. SQL Standard
10. **Problems with SQL**
11. **The Single vs. Dual DBMS Strategy**
12. **Distributed Database Issues**
13. **Different Types of 4th Generation Languages**
    - a. Programs
    - b. Information center
14. **How to Categorize and Compare 4GLs**
15. **Prototyping**
    - a. What is it?
    - b. Why is it needed?
    - c. How to do it?
    - d. When to use it and when it doesn't work
16. **The Management Implications of Using 4GLS**
    - a. Can 4GLs be used on complex projects?
    - b. The need for data-driven design
    - c. Why novices may be better than experienced programmers with 4GLs
    - d. Computer resource utilization with 4GLs
    - e. How the use of 4GLs affects the turnover of your programming staff
17. **How to Evaluate DBMS & 4GLs**

SPECIAL UPDATE

IBM's Software Products

DB2, SQL/DS, QMF, IMS, CSP, AS

A critique of IBM software products will be part of the first day's presentation. Our consultants are continually surveying users of IBM's software products. Feedback from current users will be provided for attendees.

AFTERNOON SEMINARS

SEMINAR OUTLINE

George Schussel

Mainframe Software and Associated Micro-Products

1. IBM's Database and Programmer Productivity Aids
- a. A review and forecast of the total installed base of IBM mainframe compatible DBMS
- b. Choices for the IMS, DL/1 user
- c. SQL and DB2: IBM's relational products
- d. An evaluation of DB2 against Codd's rules
- e. Software to complement DB2
- f. The costs of using IBM software
- g. Performance implications of DB2
- h. User surveys of DB2 and SQL-DS
- i. Likely DB2 futures
- j. IBM's application development tools
- k. Evaluation of CSP
- l. What CSP is missing

2. Integrated Development Software for Mainframes
- a. Cullinet/IDMS/R
- b. ADR/DATACOM
- c. CCA/204
- d. Software AG/ADABAS
- e. Mitrol/MITROL
- f. Computer Associates/UNIVERSE
- g. Oracle/ORACLE
- h. RTI/INGRES
- i. More

3. Programmer 4GLs (for mainframes)
- a. Software AG/NATURAL
- b. McCormack & Dodge/MILLENNIUM
- c. MSA/INFORMATION EXPERT
- d. More

4. COBOL Generator/4GLs
- a. PACBASE
- b. ACCOLADE
- c. INTELLIGENT ASSISTANT
- d. APS
- e. TRANSFORM

5. Database Machines
- a. Teradata
- b. Britton-Lee

6. Evaluation and Discussion of End-User Software
- a. Decision support systems such as System W, IFPS
- b. PC-oriented tools such as ICMS/GOLDENGATE, PC/FOCUS
- c. Information Center software such as AS, RAMIS II, NOMAD2 & FOCUS
- d. English language products such as INTELLECT, ENGLISH
- e. Query languages like ASI-INQUIRY

7. Design Aids and Tools
- a. CASE-oriented products like KNOWLEDGWARE
- b. Graphical-design oriented products like TIP
- c. Workbench development products from CCA and ADR

8. Non-370 Mainframe Products
- a. Unisys, NCR, Sperry

SEMINAR OUTLINE

James Davey

Supermini and Micro Software

1. Supermini Hardware Vendor Software
- a. Digital's VIA, Rdb, RALLY
- b. Hewlett Packard/IMAGE and HPSQL
- c. Data General/DG and SQL
- d. Wang/PACE
- e. Concurrent Computer/RELIANCE PLUS
- f. Prime/PRIMEWAY and INFORMATION
- g. Others

2. Supermini Integrated DBMS and 4GLs
- a. Mainframe Products
  - –Software AG/ADABAS/NATURAL
  - –Info. Builders/FOCUS
  - –Others to come
- b. Relational Pioneers
  - –Oracle/ORACLE
  - –RTI/INGRES
- c. Other Contenders
  - 3CI/INFOCEN
  - Software House/SYSTEM 1032
- d. New DBMSs
  - –Sybase Inc.
  - –GDS/GALAXY
- e. More

3. Supermini 4GLs and Application Generators
- a. Cognos/POWERHOUSE
- b. Cortex/APPLICATION FACTORY
- c. Henco/INFO
- d. Pro/PRO IV
- e. More

4. Supermicro (UNIX and MS-DOS)
- a. Informix/INFORMIX-SQL/4GL
- b. Unify/UNIFY
- c. RTI/INGRES
- d. Oracle/ORACLE
- e. DLC/PROGRESS
- f. QINT/SQL
- g. MDBS/MDBS III, KNOWLEDGEMAN & GURU
- h. dBASE III PLUS
- i. R:BASE 5000
- j. Others

RELATIONAL DBMS AND 4GLS: THE NEXT

Now that 4th generation application development tools are well accepted, the question arises "Where are we going to and what will be the characteristics of the 5th generation of application development"? Future issues are a major discussion item at the DB+4/5GL Symposium. A summary of some discussion points from recent symposia are presented below.

RELATIONAL DBMS

Occasionally, one hears comment about "post-relational" DBMS. Adoption of such a technology seems unlikely in the near to mid term future. The advantage of the relational model's mathematical underpinings and the promised wide adoption of the ANSI standard SQL make it highly unlikely that some other logical view of data for commercial processing will be widely adopted in the next ten years.

It is clear, however, that one weakness of relational modeling lies in its modest ability to capture meaning in the same way that network-oriented views of data can. It's most likely that various "semantic modeling" extensions to the relational model will be proposed and one or more may achieve widespread adoption. The ability to capture more meaning in your database structure can mean significant additional savings at the programming level and superior control for data administration.

A number of new relational DBMS's from companies like Sybase, Tandem and Interbase are now targeting the high performance relational DBMS market. These vendors claim distributed capabilities and significantly increased transaction processing potential. Meanwhile, established relational DBMS's such as ORACLE, INGRES, and INFORMIX continue to improve their transaction processing potential by an average of 30%/year. These software improvements combined with rapidly improving MIPS/$ hardware mean that while INGRES 2.0 on a VAX 11/780 was not feasible for your application, INGRES 5.0 on the VAX 8550 will have an 800% cost per transaction improvement and may therefore be very feasible.

Our conclusion is that while network-oriented data views are likely to remain superior for difficult transaction processing applications for the next few years, an ever increasing majority of transaction processing applications will be amenable to solution by relational DBMS's.

DATABASE MACHINES

One important approach to transaction processing in tough relational processing applications is database machines. Teradata and Britton Lee, offer some significant cost improvements in high volume relational transaction processing. Teradata, for example, has some benchmarks showing a 10–1 price/performance improvement over the use of a straight software only DB2/SQL implementation.

Digital Consulting does not expect to see a relational DBMS machine from IBM. The reason is not technology but business. The widespread advent of personal computers has meant that many mainframe functions have now been transferred to cheaper personal computers. Architecturally, then, one can look at mainframes as evolving into data base machines and network servers. The concept of a database machine is to offload the database accessing and control from the mainframe to a parallel processing, micro computer architecture. If the job of handling the user interface is offloaded onto personal computers while the job of handling database access is offloaded onto back end machines, the question arises, what is left for the mainframe? The answer of course is nothing, and that is the principal reason why IBM won't do anything to encourage the growth of database machines.

PRODUCT PRE

ONE-HOUR PRESENTATIONS WILL BE

Vendor	DB & 4GL Packages
Applications Software, Inc.	INTERROGATE
Applied Data Research, Inc.	DATACOM/DB
	IDEAL
	DATA DICTIONARY
Britton Lee, Inc.	BL8000, BL300
	IDM-2,
	FOCUS-4GL
Cognos, Inc.	POWERHOUSE
Computer Associates International, Inc.	CA-UNIVERSE
CompuServe Data Technology	SYSTEM 1032
	SYSTEM 1022
Computer Corporation of America	MODEL 204 DBMS
	IMAGINE, ACCOLADE
Cortex	APPLICATION FACTORY
Cullinet Software, Inc.	IDMS/R
	ADS/O
	GOLDENGATE
Digital Equipment Corp.	VIA, Rdb and 4 GLs
Gateway Systems Corp.	SYNERGIST
Henco Software, Inc.	INFO - DB+
Hewlett-Packard	ALLBASE
	HP/SQL
IBM Corporation	IMS, SQL/DS, AS, DB2, CSP
Information Builders, Inc.	FOCUS INFORMATION CENTER
	FOCUS APPLICATION DEVELOPMENT
Information Resources, Inc.	EXPRESS, EASYTRAC, FCRS
Integrated Data Base System	IDBS

The products presented represent varied
IBM, DEC, Burroughs/Univac, Honeywell,

SQL

There has never before been a standard data access language. SQL is going to change that. SQL was developed by IBM in the late 1970's and IBM has based its two strategic DBMS products, DB2 and SQL/DS, on SQL. The most successful independent DBMS software vendor, ORACLE, is based on SQL. The American National Standards Institute and the International Standards Organization have adopted SQL as the standard language for relational DBMS access. The United States Department of Defense will require SQL in future procurements.

Relational but non-SQL vendors such as RTI with INGRES and INFORMIX and Computer Associates with UNIVERSE have quickly rushed SQL implementations to market. Non-relational vendors such as Cullinet, Software AG and Computer Corporation of America have announced that they will be supporting SQL.

With all of these things going for it, it's clear that by the 1990's SQL will be the standard language for data manipulation, definition, and

FEW YEARS by GEORGE SCHUSSEL

ESENTATIONS

HELD ON EACH OF THESE PRODUCTS:

Vendor	DB & 4GL Packages
Management Science America, Inc.	INFORMATION EXPERT
Manager Software Products	MANAGER PRODUCTS & SOURCEMANAGER
McCormack & Dodge	MILLENNIUM
Micro Data Base Systems, Inc.	MDBS III
Micro DecisionWare	PC/SQL-LINK
Mitrol, Inc.	MITROL
MultiSoft, Inc.	SUPER-LINK
MUST Software International	NOMAD2
On-Line Software International, Inc.	INTELAGEN RAMIS Workstation UFO Productivity System
Oracle Corp.	ORACLE
Pansophic Systems, Inc.	TELON
Pro Computer Sciences, Inc.	PRO-IV
Rapport Corp.	RAPPORT
Relational Technology, Inc.	INGRES
Rhodnius	EMPRESS RDBMS
Sage Software	APS
Software AG of N.A.	ADABAS NATURAL
Technology Information Products Corp.	INFO MODELING, DATA MODELING
Teradata Corporation	DBC/1012
3CI	INFOCEN
Transform Logic	TRANSFORM
Unilog, Inc.	GEN/1
Unisys	MAPPER & LINC II
Wang Laboratories, Inc.	PACE
Zanthe	ZIM

ardware environments which include: Data General, Prime, Wang and CDC.

ontrol. This will offer important portability benefits for both human kills and software.

SQL is not suitable as an end-user language. For any but trivial uses QL should be handled by programmers, not end-users. Proficiency vith SQL is best achieved when the user has some academic back-round in set theory and propositional logic.

Therefore, we expect to see SQL "generators" becoming important. Vhen SQL becomes the generated rather than the written language, sers can keep the advantage of familiar interfaces such as spread-heets, yet at the same time, generate applications that are portable om one database engine to another.

Viewed a few years from now then, SQL's major importance will be s the standard language for data access communication from one soft-are system to another. SQL ultimately is more important as a soft-are rather than as a human interface.

DISTRIBUTED PROCESSING

In the 1990's leading edge organizations will be using three-tiered computing. The idea behind three-tiered computing is to support personal workstations at the individual or group level, mini-computer data processing at the departmental level, and mainframe hardware to handle common data base applications that run across several departments or companies. There are two software technologies that will allow this. The first is distributed database technology, while the second is cooperative processing.

The idea behind distributed databases is to have a single logical database implemented over diverse machines. Early incarnations of distributed database software are now available from vendors such as Relational Technology, Oracle, and ADR.

Cooperative processing systems such as PC/SQL-link from Micro DecisionWare of Boulder, Colorado or SYNERGIST of Gateway Systems of Lansing, Michigan or SUPER-LINK from Multisoft of Edison, New Jersey represent an alternative technology approach to building distributed applications. The logic behind these systems is to offer 4GL application development on a workstation coupled with an active Data Dictionary on a central minicomputer or mainframe. The Dictionary power is such that reusable functions can be built into the system and that the logic of its architecture supports both development and execution on a distributed basis.

The 5th generation of application development will be heavily characterized by both a development and execution environment that is largely distributed. Distributed DBMS and cooperative processing systems will lead in providing the support necessary for the building of these applications.

STANDARD ENVIRONMENT

The early 1990's will certainly give rise to the recognition of six broadly implemented operating system environments, all of which are so widely used as to be considered "standards".

1. DEC's VMS
2. IBM's MVS
3. IBM's VM
4. AT&T's UNIX
5. Microsoft's MS DOS
6. IBM's and Microsoft's OS/2

The most popularly used software tools will be available in all of these standard operating environments. In other words, the movement over the last few years of popular products toward offering a diversity of operating environments and a diversity of interfaces for users will continue unabated into the 1990's.

CASE AND 4TH GENERATION TECHNOLOGY

By the mid 1990's the building of applications by business analysts using integrated CASE/DBMS/4GL technology and without programmers will be normal and expected. More than any other single technology the dependency on CASE techniques will truly define the 5th generation.

THE ADVENT OF EXPERT SYSTEMS

At the current time very little AI technology has permeated the world of commercial systems. Expert systems offer the greatest promise of changing that.

By the 1990's rule based programming will be available to normal commercial programmers. Like DBMS, transaction processing monitors, and report writers, expert systems will become another tool in the application builder's portfolio.

SPEAKERS

DR. GEORGE SCHUSSEL is one of the world's foremost experts in data base management technologies. He is President and founder of Digital Consulting, Inc , a prominent high technology education and management consulting firm that specializes in software productivity tools and is recognized as the world leader in DBMS and 4GLs.

Hardware and Software Futures and the 5th Generation of Computer Technology

Topics
- The Future of Integrated Circuit Technology
- The Need for Parallel Architectures
- Microcomputer Futures
- An Evaluation of Artificial Intelligence
- Expert and Knowledge-Based Systems
- The Future of DBMS Software

LARRY DeBOEVER is President of DeBoever and Associates and a leading authority on systems integration issues. He has served as Strategic Planning Director for Ungermann-Bass, and was President of Linkware. He is a founder of Pansophic/Christensen Systems and was previously a Vice President of Computer Corporation of America.

Corporate Connectivity

Topics
- The Pressure for Achieving Corporate Connectivity
- Basic Connectivity Technologies
- Obstacles to Connectivity
- Trends in Computer Connectivity
- A "Hypothetical" Case Study

ALBERT CASE, JR., a nationally known lecturer and author, is Director of Technology Transfer for Nastec Corporation, a Computer-Aided Software Engineering firm. Mr. Case has spoken at many national conferences, published articles in several trade publications and has written a book. Al Case is currently the instructor of DCI's "Software Engineering and CASE Technology" seminar.

Trends in Case Technology

Topics
- Setting CASE Expectations: Defining Productivity
- Systems Development Characteristics
- Problems and Their Solutions
- CASE—An Integrated System to Build Systems
- The Scope of CASE: Information Engineering
- Getting Started

KEN ORR is Chairman and Chief Scientist of Ken Orr & Associates, Inc , which specializes in software engineering environments that integrate technology, tools and training for maximum productivity.

Orr is a frequent speaker at international conferences and seminars. He has authored several books and has been a contributing editor to INFOSYSTEMS magazine and has written for other industry trade publications.

Data Architecture, Data Base & Reality

Topics
- Framework: What are the Problems and Solutions?
- Data Architecture—Knowing What To Do
- Information Systems Architecture
- Data Base—Knowing How To Do It
- Reality—Doing It
- Future Technologies

VAUGHAN MERLYN is a well-known authority on Application Generators and 4th Generation Languages, specializing in their use in the Information and Development Centers. He consults for major vendors and prospective users of fourth generation technologies and has also authored the widely-acclaimed report, "Application Development Systems—The Comparative Consumer Report."

Leveraging Application Development Productivity

Topics
- Redefining the Productivity Problem
- Setting Productivity Expectations
- Available Productivity Tools—Their Roles and Pitfalls
- Why Most Development Aids become "Shelfware"
- Avoiding the "Shelfware Syndrome"

LARRY ELLISON, President and Founder, has been the President and a Director of Oracle Corporation since its organization in 1977. Before founding the company, Ellison held key development posts at Amdahl and Ampex Advanced Research. He holds advanced degrees in Physics from the University of Illinois and the University of Chicago.

The Commoditization of Software Technology

Topics
- Costs of Hardware vs. Software
- Coming Hardware and Software Standards
- The Expansion of Software Lifetimes
- The Importance of Software Portability
- Software Standards—A Must

Developing Applications with Relational DBMS

Dallas, November 19–20, 1987 **Boston, December 3–4, 1987**

FREE Seminar to 3-Day Attendees*

Although relational theory will be covered, the focus of this seminar is a practical one—applications development rather than theory.

Relational technology, especially when paired with powerful application development tools such as fourth generation languages, application generators, information center products and artificial intelligence systems can provide dramatic improvements in application development productivity. The key is that it facilitates understanding between producers of information systems and the consumers of information systems. The underlying simplicity of the relational model enables users to develop a consistent, coherent conceptualization, or cognitive model that provides predictive and explanatory power for understanding data. Another related benefit of relational technology is its flexibility and forgivingness in accommodating database design changes. This encourages the use of prototyping, allowing expansion and refinement of system requirements definition.

The universal acceptance of the relational model has led to fundamental changes in the DBMS/4GL marketplace. By the 1990s, the revolutionary changes in networks, hardware and software will dictate the necessity for relational systems. You can't afford to wait until then to acquire an understanding of this most important enabling technology.

JEFF TASH
Jeff Tash is President and Founder of Database Decisions, Inc., an education and consulting company that specializes in database technology and decision support systems. Previously employed by DEC, IBM, CDC, Arthur Young and most recently affiliated with Codd and Date Consulting Group, Jeff has extensive experience in relational database management, fourth generation languages and artificial intelligence. Jeff has assisted a wide range of Fortune 1000 firms understand the impact of relational technology in their organizations and develop ways to evaluate and utilize relational products to gain a competitive advantage. His knowledge of the computer industry coupled with his extensive professional experience bridges the gap between theory and practice. He provides practical tips and techniques on how to integrate and deploy the new information technology.

SEMINAR OUTLINE

1. Enabling Technologies

2. Application Architectures
- –Mainframes vs. Minis vs. Micros (3-tiers)
- –Batch vs. T/P vs. Timesharing vs. Workstations
- –Centralized vs. Distributed vs. Cooperative Processing

3. Application Development Productivity Issues
- –Prototyping vs. Traditional Life Cycles
- –Relational vs. Navigational DBMSs
- –Single vs. Dual Database Strategy
- –Development Centers vs. Information Centers vs. Production Centers

4. Relational Model
- –Data Structure
- –Integrity Rules
- –Relational Algebra & Views
- –Codd's Relational Rules

5. Database Design
- –Entity/Relationship Modeling
- –Normalization

6. Data Resource Management
- –Data Administration
- –Database Administration

7. Technical Issues
- –Performance & Physical Design Options
- –Concurrency / Recovery / Integrity / Security
- –Connectivity & Distributed DBMS

8. User Interface
- –Relational Languages
- –Screen & Menu Design
- –Human Factors Engineering

9. Summary & Recommendations

*Substitutions will be accepted for this seminar within the same city.

BENEFITS OF THE SYMPOSIUM

1. **Day One Seminar**—You will learn the key concepts of 4GLs and how to effectively compare products.
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Use project pilots to set application boundaries

BY ROBERT GILMORE

In examining the role IBM's DB2 can play in the development of new applications and in the migration of old ones, careful evaluation of its usefulness will largely depend on how well the pilot applications are identified and implemented.

A project piloting a production-type application is necessary for the success of DB2. An organization must find out for itself how well DB2 functions in its application environment. That means measuring what DB2 can and cannot do as a transaction processor, not simply accepting what has been written and said about it.

Organizations that have never spent much time with their data will find a pilot application project to be an eye-opener. Development issues that have previously been pushed aside must now be confronted and dealt with. The processes of normalization and "intelligent denormalization" of data will require education, direction and guidance from one who has wallowed in the waters of data analysis before. If you are not going to take data analysis seriously, don't bother to expect good performance from DB2.

Laying the groundwork

Political and procedural issues must be considered before bringing DB2 into a firm on a full-scale basis, and some of these can be previewed in the pilot.

With the implementation of DB2, various functional areas within the organization will necessarily experience some change. The data administration organization will be given more responsibility for data analysis and design. This means more time will be spent in the general design phase of the project — time that will be well spent.

The data base administration staff will also be affected. It will need to establish new and different levels of authorization and control as well as a new monitoring and tuning philosophy for the use of DB2 within the firm. Additionally, information centers and walk-up service organizations, faced with the growing sophistication of their clientele, must become more involved with end-user requests for data access and, in most organizations, more involved with access authorization and control.

Because of the increased demand for remote data access, the communications group will require more capacity planning and need to more carefully evaluate line compression software to minimize the impact of additional data transmission.

In addition, when preparing for a DB2 pilot, organizations ideally must attempt to identify new policies, procedures and standards. If possible, the first drafts of any new policies should be available for use by the pilot project team. These will change based on what is encountered during and after the pilot, so they should be documented in a flexible enough manner to allow for change and modification.

New interfaces to the system development methodology processes must also be identified and addressed. Although these new interfaces must be established, they do not necessarily have to be in place before the pilot application.

The DB2 pilot application can be accomplished but not without the identification of the following selection criteria.

The team. The individuals responsible for selecting the pilot application should be the DB2 team responsible for evaluating the application. This team should consist of four to six of the best individuals from various functional areas within the organization.

> AN ORGANIZATION must find out for itself how well DB2 functions in its application environment. That means measuring what DB2 can and cannot do as a transaction processor, not simply accepting what has been written and said about it.

Each team member should possess good verbal and written communication skills and be able to make accurate, objective evaluations. The best candidates for the job will be capable of performing complete analyses and communicating results and recommendations to management.

Duration. The project selected should be moderate in size. Large projects take too long and inevitably may stall because of outside priorities and management's impatience. Projects that are too short generally generate little enthusiasm, and the limited results can make adequate analysis impossible.

Complexity. The pilot project should be fairly complex in terms of data relationships and processing requirements. Data identification and analysis should account for approximately 40% of the project's time frame. All types of data should be used, with an emphasis placed on the different business processes that utilize varying data types from different relations.

Processing requirements should include basic and complex inquiry, procedural and nonprocedural logic and limited and complex update processing. By mixing these, the project should be able to measure what is reasonable in terms of set sizes; the use of index processing; the impact of joins, subqueries and built-in functions; and the ability to process complex business transactions concurrently.

In the pilot project, application processing should consist of a moderate number of transactions, with approximately 50% using embedded SQL statements and the other half broken down as processing requirements dictate.

Familiarity of data. Although data relationships should be fairly complex, the system chosen for a pilot project should use data with which everyone in the firm is familiar. This offers advantages to the overall organization as well as to the pilot project team.

First, familiarity will enable the project team to accurately identify relationships and how data is accessed within the organization. Second, the team will know in advance how data should behave. Most important, the project's results will be easier to communicate and translate to the rest of the organization.

User acceptance. In order for DB2 to establish a meaningful position within the organization, user approval and acceptance is critical. Having users actively participate in the pilot project will be one way of ensuring that they accept and are comfortable with DB2 and its capabilities.

Transaction processing monitors. Although many organizations use IBM's TSO with ISPF to test and develop DB2 applications, such an environment will probably be disastrous for true transaction processing. The pilot project should use the monitor that is the most familiar, stable and, in the long run, strategically supports the production environment.

Training. In implementing a data base management system, a lack of education has historically caused many problems, ranging from lack of understanding of the product's functional capabilities to poor communication between functional areas using the product. DB2 is no different. In fact, since more areas of the organization could use its capabilities, the greater the need for DB2 education becomes.

The pilot team must be trained in all areas of DB2. The team should receive the best training available in logical design and data analysis; data base design and administration; SQL application programming and development; use of IBM's Query Management Facility and, if required, Data Extract; and some techniques in optimization and tuning of DB2 applications. Proper training will ensure the correct steps are taken during pilot application development and that the project team will be able to accurately assess both actual and anticipated results.

Isolation. Although the pilot project should involve a usable and fairly visible application, the initial system chosen should not be an application critical to the success of the business, nor should it involve many interfaces and dependencies. The intent is to obtain a thorough knowledge of the capabilities of DB2; this knowledge can be obscured by outside production and political influences.

The production pilot project is necessary to establish the boundaries within which DB2 will reside. DB2 is a stable DBMS, one that offers some great capabilities. The environments, however, must be identified, established, monitored and controlled and the pilot project carefully identified and planned. Anything short of these requirements might result in a DB2 environment that is unnecessarily unstable, unpredictable and, ultimately, disappointing. •

Gilmore is manager of Consulting Plus, a specialized management consulting service offered by Data Base Management, Inc. in Manchester, Conn.

Tracking DB2 performance

BY MICHAEL HERMIDA

IBM's DB2 performance is a subject that has drawn much interest in the last few years. Managers, DP staff and even business users are questioning whether DB2 can adequately support their performance objectives for planned applications and if their existing DB2 applications are achieving peak performance.

Among the most frequently expressed concerns are the following:

- Why the response time for one transaction is so much longer than that for a similar transaction.
- Whether overnight batch update activity can be accomplished within the allotted time.
- Why DP costs increased significantly last month.

To adequately track DB2 performance, each DB2 installation should have a performance monitoring plan in place. This plan should specify what data to collect, how frequently to collect it and what reports or displays to use to analyze it.

Performance monitoring is closely related to performance prediction and tuning. Predicting performance helps determine whether an installation's hardware and software capacity can adequately handle its current and projected work load. Performance tuning maintains an installation's stated objectives within the existing DP environment.

Determining objectives

Performance monitoring provides input both to prediction and tuning activities. It involves collecting and analyzing an installation's performance data to understand its work load characteristics and determine whether performance objectives — such as response time and throughput — are being met.

Performance monitoring data falls into two categories — historical data and real-time data. Each category provides valuable information for understanding and tracking system work loads, anticipating and detecting problems and providing clues that will be useful in resolving problems.

Monitoring DB2 performance is, in many respects, similar to monitoring any other data base system. The performance analyst needs to understand how the DB2 work load consumes resources and what factors are causing delays. Although the main concern may be DB2, it is equally important in the DB2 environment to understand IBM's CICS, IMS and TSO performance characteristics.

Because an installation's DB2 work load is closely tied to the SQL statements executed by its transactions and programs, understanding the CPU and wait times associated with these statements is important. This understanding is gained through periodic monitoring of variables such as average CPU and I/O times for transactions and programs. By understanding typical work load characteristics, detecting abnormal conditions becomes easier.

Historical perspective

How is DB2 performance monitored in today's environment? Let's look at historical data monitoring tools first.

During DB2 subsystem operation, an installation chooses the data to be recorded by DB2. The data is classified as statistics data (associated with overall DB2 activity), accounting data (associated with user or transaction/program activity) and performance and global data (detailed trace information).

Requested data is typically written to MVS System Measurement Facility (SMF) data sets. A number of tools are now available to process and report this data, including IBM's Database 2 Performance Monitor (DB2PM), MICS/DB2 from Morino Associates, Inc. and MXG, which runs on the SAS system, available from SAS Institute, Inc.

Using these tools, an installation monitors key performance indicators such as DB2 buffer pool activity, locking contention, the number of types of SQL statements executed, and log, user and plan activity. Standard reports provide information useful to the analyst in understanding the DB2 environment.

Currently, DB2PM is the only tool that reports on performance and global data classes. Although this data is useful in some cases, recording these classes can create significant overhead. Thus they are normally used only in specific trouble-shooting or in performing detailed monitoring.

MICS/DB2 and MXG with SAS allow creation of tailored reports combining DB2 data with data from other subsystems. With this data on the same report, the entire monitoring process is made easier.

Other tools for processing historical data are ones that have supported CICS and IMS in the past and have since been updated to provide basic DB2 support of some kind. These processing tools include Monitor for CICS from Landmark Systems, Inc. and IBM's IMS Performance Analysis and Reporting System, IMS DC Monitor and CICS Performance Analysis

Hermida is a vice-president with Knauer Consulting, Inc., a New York DB2 consulting company

Reporting System.

These tools provide limited information about DB2, such as the impact DB2 is having on transaction response time and the average time per SQL call.

DB2-SMU from CDB Software is a tool that monitors DB2 data and its characteristics rather than resource usage and delays. Aside from some integrity functions, DB2-SMU reports on free-space distributions, update activity, the estimated effect of data reorganization as well as some index information. The information is helpful in understanding actual table and data set characteristics.

Real-time monitoring

While a number of tools to analyze DB2 historical data are available, an installation receives a limited amount of information regarding current DB2 activity. DB2 display commands provide some basic information on DB2 connections, data usage and locks, but the data is not automatically updated on-line.

Candle Corp. is making progress in providing real-time information through Omegamon and Dexan, which monitor MVS, IMS and CICS environments. In the CICS environment, an indication is given when a transaction is being processed by DB2, and a display can be presented to show what system activity, including DB2, is affecting CICS work. In the IMS environment, timings on termination and SQL calls are available. Exception reports are also provided for some conditions.

Although these products give some real-time insight on DB2 activity and its impact on the existing work load, they do not provide much information on specific DB2 processing in progress. When monitoring a DB2 system in real time, it would be nice to have information available that would pinpoint problems and bottlenecks as they occur.

Wish list

In light of the functions provided by current DB2 monitoring tools, there are some tool requirements that would further simplify the monitoring task:

- Better integration of data on standard reports that associate DB2 activity with CICS, IMS, TSO and MVS activity.
- Additional exception reporting capabilities with flexible reporting criteria.
- Detailed DB2 on-line monitoring that provides current activity and bottlenecks.

It would also be nice to see tools that recommend tuning activities based on analysis of the collected data, either historical or real-time, thereby reducing the time to resolve problems.

With a properly constructed plan and the tools discussed above, any questions an organization might ask about DB2 become easier to answer. •

Attention to naming conventions will ease DB2 decision making

BY JOYCE BISCHOFF

Don't try calling a rose anything else in the DB2 world. The name is the reality in that environment, which is why developing naming conventions is such a critical matter in IBM's DB2.

Unlike older systems, the objects of which are linked by IBM's JCL, DB2 objects are connected within the DB2 subsystem by names that are stored in a central catalog.

Carefully selected names may be used to separate test and production data and identify tables containing summary, extracted or raw data. They may help identify resources belonging to a single application and facilitate communication between users and developers.

At the time of installation, important decisions must be made. Names must be given to subsystems and to the ICF catalog, and each name must be distinct and unique.

If such distinctions are not made, moving from test to production will require painstaking name changes to guarantee that the names will be unique within the subsystem. The ICF catalog name is selected at installation and locked in; this provides the high-level qualifier of all VSAM data set names.

General guidelines

Although DB2 limits the names of data bases, table spaces, plans and storage groups to eight characters, it will allow a maximum of 18 characters for tables, views, indexes and columns. Unfortunately, most application generators will not support more than eight characters. In addition, if an installation plans to define its own VSAM space by bypassing the use of storage groups, index names must be limited to eight characters.

Qualified names must be unique within a DB2 subsystem (see chart). The object creator's ID, as well as the high-level qualifier, can be overridden during object creation to indicate, for example, the table to be used for testing or production or the name of the owning application. Many installations limit the use of the creator's ID to the contents of personal data bases.

Many organizations use a particular character position, often the first, to indicate the object type. For example, D might be used for data base, T for table, V for view and S for table space.

The last character of the object type's name may be reserved for special usage within each object type, such as indicating raw, extracted or summary data. Some installations that put test and production data on the same subsystem use the sixth or seventh character of each name to differentiate between test and production data. In all cases, the names should be as meaningful as possible.

Data bases and storage groups. Although a data base does not physically exist, it is a convenient way to group tables and table spaces for administrative purposes; the owning application may be indicated in the data base name.

Occasionally, installations designate one data base for each table and table space to maximize concurrency during utility usage. For these installations, it would be convenient to give the same basic name to the data base, table space and table, except for the single-character object identifier.

No data base name may begin with DSNDB, as that is a name reserved by DB2 for its own use.

Table spaces. In a production environment, it is usually more convenient to designate one table per table space unless there is a special performance reason for combining multiple tables in a table space. For example, in a payroll system, placing the Employee and Department tables in the same table space might be good for performance because they are accessed together.

The names of tables and table spaces should probably be the same, except for the single-character object identifier.

Indexes. Again, names should relate to the tables on which they are based. The first character might be "1," characters two through seven might match the name of the base table, and the eighth character could guarantee uniqueness in the case of multiple indexes.

Plan and program names. Most organizations maintain existing standards for program names; plan names should probably match the names of the programs that use them.

Synonyms. Synonyms are qualified by the creator's authorization ID and may not be the same as an existing table, view or other synonym in the system.

Column names. Data administrators play a major role in selecting appropriate column names because of the redundant data that is present in foreign keys.

Since DB2 does not support foreign keys, establishing a dictionary relationship between column names and a global business definition might be considered. The list of business definitions should contain one name and definition for each data element the business uses. This could point to each table containing that data element.

VSAM names. The structure of VSAM names is prescribed by DB2 and allows little flexibility for individual organizations. VSAM names must adhere to the following six-level format: d.DSNDBn.b.t.I0001.A001.

In the first level, d represents the eight-character high-level ICF qualifier; in the second level, DSNDBn indicates either the data name or the cluster name. The third level is the data base name, b; the fourth level the table space name, t. Each is limited to eight characters.

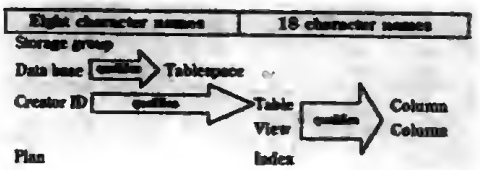
Level five, I0001, is a set one that is mandated by DB2. The sixth level indicates a relative data set or partition number; it is specified by A and followed by the number of the set or partition. Since the first, third and fourth levels are the only ones that allow the user to make any choices, existing chargeback schemes may need to be modified for DB2 data sets.

Selecting DB2 naming conventions that meet a particular organization's needs is a challenging task that presents both the opportunity for better communication with personnel and the potential pitfalls of higher expenses and complex design considerations.

However, if all users involved with DB2 participate in name selection, then naming conventions may be developed that will meet the organization's unique requirements and improve communication between users and technical personnel. •

Naming DB2 objects

All DB2 objects attain their uniqueness through qualification, a process that establishes object names according to levels of data within the subsystem. Typically, each label qualifies the next, with the first level being the most critical.



CW CHART

Bischoff is a staff consultant responsible for DB2 data base administration at Reliance Insurance Co. in Philadelphia.

Eliminating ugly surprises in the DB2 environment

BY BARBARA von HALLE and STEVEN H. CAMPBELL

DB2 security implies different things to different organizations. However, the following four goals should underlie the security philosophy of most IBM DB2 sites:

- Establish privileges in a timely manner.
- Restrict privileges.
- Provide an audit trail.
- Separate data and data base privileges.

Achieving these goals is not easy. To start with, the security mechanism of DB2 is quite complex — and full of surprises for the uninitiated. Second, there is a shortage of products to assist in DB2 security administration. Third, it is difficult to make major modifications in DB2 security without unpleasant ramifications. Finally, integration of DB2 with an already established security scheme may require organizational and cultural changes.

Establishing privileges in a timely manner requires implementing a security scheme that does not bottleneck application development or production. Because DB2 security is multifaceted, involving access control for data, application plans, catalog utilities and so on, it can hinder productivity.

One helpful strategy is to evaluate the need for new or redefined organizational roles, specifically the following:

- A DB2 system administrator to act as keeper of DB2 system resources.
- A DB2 data base administrator to provide technical data base support.
- A system security administrator to provide access to underlying data sets and to interfacing systems and to assign DB2 authorization IDs.
- Centralized and decentralized DB2 security administrators to support MIS security requirements and service end users respectively.

Protecting productivity is made easier by understanding an organization's DB2 development and production environments.

Restricting privileges ensures that only authorized individuals can perform critical DB2 activities.

The challenge here is that most DB2 objects are associated with an owner,

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Von Halle is director of technology planning for Spectrum Technology Group, Inc. in North Branch, N.J. Campbell is senior data base analyst at Public Service Electric & Gas Co., based in Newark, N.J.

VENDOR VIEWPOINT
There's safety on the border

BY ROBERT ASHTON

Installations using IBM's DB2 find it a plus to be able to use the same data base management system for production and ad hoc users. However, because the potential for any user to select and update production data is very real, security and auditing in the DB2 environment are major concerns.

Most installations have MVS security systems that provide control over MVS resources such as data sets, logon passwords and transactions. However, these systems are not adequate to control and audit DB2 resources.

The security system within DB2 provides the power necessary for control of a mixed production and ad hoc environment; however, the level of detail and expertise required can make the system cumbersome to manage. For that reason, installations should consider the organizational and manpower resources required to carry out DB2 security before instituting such an environment.

Security facilities within DB2 provide a high level of control — down to the column level — over each user. This control allows installations to precisely define the type of access each user may maintain over each resource.

Resource control

Control of DB2 resources is implemented using SQL GRANT and REVOKE statements. These statements allow an authorized security administrator to provide each user with specific privileges over specific resources. Users are uniquely identified by an eight-character authorization ID.

DB2 does allow for seven types of resources, each of which has been allocated a specific number of associated privileges. Buffer pools, for example, have only one privilege, while tables have seven and data bases have 15.

Because of the potentially large number of DB2 users and resources in a production environment, the resource privilege requirements for user classes within each application should be documented. This documentation greatly reduces the manpower required to authorize new

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Ashton is founder and president of DBView, Inc., a firm specializing in DB2 systems software in Waltham, Mass.

DB2 application development systems

COMPANY	PRODUCT	DML[1] ALLOWS INTERACTIVE MODIFICATIONS	USES SKELETON TABLE TO PROMPT FOR SPECIFICATIONS	INCLUDES DEFINE FEATURE FOR CREATION OF VIRTUAL FIELDS	INCLUDES SOFTWARE FOR STATISTICAL ANALYSIS	INCLUDES SOFTWARE FOR FINANCIAL MODELING	SPECIAL-PURPOSE APPLICATIONS SOFTWARE	INCLUDES GRAPHICS PACKAGES	KINDS OF GRAPHS PROVIDED	COLOR GRAPHICS	AUTOMATIC SCALING AND HEADINGS FOR GRAPHS	THREE-DIMENSIONAL PRESENTATION	INCLUDES GENERAL-PURPOSE PROGRAMMING LANGUAGE	PRICE
Arthur Andersen & Co. (312) 507-5161	Foundation	Yes	Yes	No	No	No	Development of commercial transaction-processing systems including workstation-based design tools, organization, host management, configuration management	Yes	Data flow diagram, Warnier-Orr diagram	Optional	No	No	Yes	$330,000 (approximate)
Artificial Intelligence Corp. (617) 890-8400	Intellect	Yes	No	Yes	Yes	Yes, limited	IBM Presentation Graphics Feature	Optional	Bar charts, pie charts, line graphs	Optional	Yes	No	No	Contact vendor
M. Bryce & Associates, Inc. (813) 786-4847	Pride series	Yes	NA	NA	NA	Yes	Information Resource Manager for recording logical and physical structures for relationships	Yes	Flow diagrams, logical and physical data models, enterprise and application models, system models	Hardware-dependent	No	No	Yes	$35,000-$250,000
CGI Systems, Inc. 800-PAC-1866	Package	Yes	NA	Optional	No	No	Software for design, generation and maintenance of large-scale production applications	No	No	No	No	No	Yes	$150,000-$400,000
Classen Systems, Inc. (813) 963-2360	Mantis	Yes	Yes	Yes	No	No	Interface to IBM Graphical Data Display Manager	No	No	No	No	No	Yes	From $35,000
Computer Corporation of America (617) 492-8860	Accolade	Yes	—	—	—	—	Release 5.0 provides initial support for DB2 through screens that allow SQL statements to be written with Accolade	—	—	—	—	—	Yes	Contact vendor
IBM Contact local IBM dealer	Cross System Product	Yes	Yes	Yes	No	No	None	Yes	User-defined	Yes	Yes	Yes	Yes	Contact vendor
	Application Development Facility	Yes	Yes	Yes	No	No	None	NA	NA	NA	NA	NA	Yes	Contact vendor
	Query Management Facility	Yes	Yes	Yes	No	No	None	Yes	Pie charts, bar charts, connected point, user-defined	Yes	Yes	Yes	NA	Contact vendor
	Application System	Yes	Yes	Yes	Yes	Yes	Information retrieval through interactive query, report writing, project- and resource-management planning, scheduling and tracking tools, end-user application development	Yes	Pie chart, bar chart, connected point, surface, scatter point, histogram, radar, map, mixed, user-defined	Yes	Yes	Yes	Yes	Contact vendor
Information Builders, Inc. (212) 736-4433	Focus	Yes	Yes	Yes	Yes	Yes	Spreadsheet, reads interfaces to IMS, VSAM, DB2, Total, Adabas	Yes	Connected point, histogram, bar chart, scatter diagram, pie chart	Yes	Yes	No	Yes	$60,000-$130,000
Informix Software, Inc. (415) 322-4100	Report/DB2	No	No	Yes	No	No	Fourth-generation report writing based on IBM's SQL	No	No	No	No	No	Yes	$16,000
Management Science America, Inc. 404-239-2482	Information Expert	Yes	Yes	No	No	No	Software for direct access and manipulation of DB2 data	No	NA	NA	NA	NA	Yes	Contact vendor
McCormack & Dodge Corp. (800) 343-8335	Millennium:SDT DB2	Yes	Yes	Yes	No	No	None	No	No	No	No	No	Yes	Contact vendor
Must Software International (203) 762-2515	Nomad	Yes	Yes	Yes	Yes	Yes	Forms-generation tools, interfaces to IDMS, IMS, Teradata Model 204, translator for SAS	Yes	Connected point, bar chart, scatter diagram, pie chart	Yes	Yes	No	Yes	$31,500-$120,000 (based on machine size)
On-Line Software International, Inc. (800) 799-6300	UPO Productivity System	Yes	Yes	Yes	NA	NA	Development of specialized applications for end users to execute and access DB2	NA	NA	NA	NA	NA	Yes	$30,000 or $45,000
	Remix Information System	Yes	Yes	Yes	Yes	Yes	PC downloading, natural language comprehension system	High-, low-resolution graphics	Connected point, histogram, bar chart, scatter diagram, pie chart	Yes, high-resolution	Yes	No	Yes	$49,000 (DOS), $66,000 (CMS), $113,000 (OS)
Panaphic Systems, Inc. (312) 572-6000	Telon	Yes	Yes	Yes	No	No	—	No	No	No	No	No	Yes	$130,000-$190,000
SAS Institute, Inc. (919) 467-8000	The SAS System	Yes	Yes	Yes	Yes	Yes	Operations research, project management, interactive matrix programming, statistical quality control, menu-building capabilities for end-user applications, forecasting, graphics	Yes	Connected point, bar chart, scatter diagram, pie chart, chernoff, surface, prism, block map	Yes	Yes	Yes	Yes	Contact vendor
Sage Software, Inc. (301) 230-3200	APS Development Center	Yes	Yes	Yes	Yes	No	DB2 catalog importer, SQL generator, DB2 data base painter, macro facility	No	NA	NA	NA	No	Yes	$3,500 (on PC), $400,000 (on mainframe)
Sterling Software, Inc. (Answer Systems division) 818-716-1616	Mark series of application development systems-RS/1	No	Yes	Yes	Yes	No	Answer series for information retrieval, micro-to-mainframe communications	Yes	Pie chart, bar chart	No	Yes	No	Yes	From $65,000
Transform Logic Corp. (602) 948-2600	Transform/DB2	Yes	No	No	No	No	None	No	No	No	No	Yes	Yes	Contact vendor

[1]Data manipulation language

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

Surprises

FROM PAGE S14

who is known by an authorization ID. The ID is appended to the object name forever; there is no rename capability. This means corporate files labeled with an authorization ID carrying an individual's name will always use that name, even if that person leaves the company. Moreover, moving data from one object to a differently named object is not a trivial task.

One solution is to set generic IDs for specific administrative roles such as DB2 system or data base administrators.

Providing an audit trail means, at the very least, producing hard-copy documentation of critical support activities. What makes this task difficult is that no historic audit trail facilities exist in DB2. The DB2 catalog merely reflects the current status of objects and authorities.

One option for getting around this deficiency is to require that all critical operations — CREATE, DROP, ALTER, GRANT and REVOKE — occur only in batch, thereby providing hard-copy output. This method will only work, however, if the generic authorization IDs used are not valid TSO IDs.

One way to do this is to use a system security package, restricting editing of IBM's JCL to one group and submission of it to another group. Another is to develop homegrown automated audit facilities, such as the build-your-own audit trail guide offered by Price Waterhouse.

Separating data and data base privileges means establishing a clear distinction between the ability to see and update DB2 data and the ability to provide technical support. For example, data base administrators might execute utilities, create objects, fine-tune and modify data bases but not view or update data. Security administrators, on the other hand, typically grant and revoke privileges but should not create objects or implement modifications.

DB2's group authorizations do not readily support separation of data and data base privileges. Some group privileges, such as intermixing data and data base privileges, provide too much authorization, and others do not provide enough. Probably the best way of handling this issue is to grant the minimum set of privileges to each authorization ID and to avoid granting group privileges whenever possible.

If some group authorizations are unavoidable, consider creating a restricted group privilege with a tailored DB2 plan — such as a modification of IBM's DSNTEP2 — that accepts only a subset of commands.

Developing a solid DB2 security scheme can be confusing and discouragingly complex, but an incomplete or inappropriate scheme can be disastrous. The time spent will be well worth the investment. •

Safety

FROM PAGE S14

users and redefine privilege requirements.

Because of the background required, DB2 security is initially performed by the data administration group. However, the security group should be involved in DB2 user authorization and be familiar with DB2 privileges, resource types and SQL.

Auditing considerations

For many applications, it is necessary to track update and query activity for each user. Although DB2 does not make auditing these easy, it is possible to provide some auditing capabilities through journaling and measurement traces, as found in the following sources:

Catalog tables. The DB2 catalog tables provide a complete list of current user privileges. The catalog's critical limitation is that it can only list existing privileges; no historical information is provided.

Accounting data. DB2 can generate accounting data for each DB2 transaction. The value of this information is limited, however, in that it does not identify the DB2 resources on which the transaction was performed.

Trace data. DB2 can selectively gather detailed trace data to aid in improving the performance of DB2 applications. This data can be used to track each SQL call for a specific user or transaction type. This trace contains the information needed to determine which user has queried or updated DB2 data by resource name and adds significantly to CPU and I/O overhead.

Application journaling. DB2 applications can be written to include their own journaling files that track data access or user updates. The drawback of this is that data accessed directly from TSO will not be recorded. The only way to ensure the audit trail's usefulness is to restrict TSO access to the production DB2 system.

The security system within DB2 is powerful enough to control data security, but the level of detail and expertise required can make the system cumbersome to manage. Auditing within DB2 must also change to meet the needs of security-sensitive applications. Although third-party software products reduce these problems, an overall security architecture addressing all levels of access across the entire IBM architecture would improve the ability of sites to establish and maintain security standards. •

Data dictionary products

Brownstone Solutions, Inc.
(212) 775-1040
(203) 358-0845
The Datadictionary/Solution

Based on the entity-category-relationship model, the Datadictionary/Solution allows users to define information assets in terms of entities and relationships. All entity, relationship, category and textual data is stored in IBM DB2 tables. The dictionary provides full SQL power to access data from within the on-line dialogue and from extensions.

Dictionary entities and relationships may be reorganized on-line. Data may be viewed in a spreadsheet format or enlarged to concentrate on a specific area. A variety of user exits are available to customize screens and intercept processing at key points.

M. Bryce & Associates, Inc.
(813) 786-4567
Pride Information Resource Manager

The Pride Information Resource Manager catalogs and controls data, system and organizational resources. The product generates SQL data base, table space, table, view and index statements for use by IBM DB2 and other data base management systems supporting standard SQL.

The Pride Information Resource Manager supports data base, system and enterprise engineering functions. Interactive facilities, security, status check, impact analysis and housekeeping are also provided. The software is written in ANSI-standard Cobol and is available in several hardware and software configurations, including IBM's MVS and MVS/XA as well as compatibles.

DSIMS Corp.
(214) 630-7837
DSIMS Data Dictionary

Formerly marketed as UCC-10 by Uccel Corp., the product was purchased and renamed by DSIMS in late 1985. DSIMS Data Dictionary controls the data resource with centralized definition of entities and relationships, including unlimited documentation of entities and key word cross-references. Release 2.0 will offer support for IBM's DB2.

The product contains security and edit routines, multiple logical dictionaries, data base management system control information, single-entry update and generation of data structures. Release 2.0 will include reporting capabilities from any entity within a DB2 structure and interfaces to external text editors. The dictionary is compatible with all IBM VS and MVS operating systems and operates in on-line environments using IBM's IMS/VS, DB/DC or CICS/VS with DL/1. Batch operation requires IBM's IMS/DB (DL/1).

IBM
Contact local IBM office
Data Base Relational Application Directory

Data Base Relational Application Directory (DBRAD) is an extension of IBM's DB2 systems catalog that contains additional information on organizational data, including object definitions and storage locations, subordinate objects contained within objects and relationships between objects.

Also included in the product are batch-mode facilities and security provisions. The product will generate summaries and reports from DBRAD tables on application interrelationships. The dictionary was designed for use in IBM's MVS and VM environments.

Manager Software Products, Inc.
(617) 863-5800
Dictionary Manager

Dictionary Manager serves as an interface between IBM's DB2 and Data Manager, providing users of DB2 and IBM's SQL/DS with the ability to administer information resources within their organizations. The product is a dictionary-driven interchange system supporting the exchange of definitions between multiple dictionaries and directories. Using Dictionary Manager, all corporate information can be stored in Data Manager while maintaining the DB2 catalog.

Users define their own translation rules converting Manager Corporate Dictionary definitions to the syntax and format of any chosen target dictionary or directory. Cullinet Software, Inc.'s IDMS Schema, Subschema and DMCL input statements may be generated directly from dictionary definitions. An IBM Integrated Data Dictionary interface is optional.

Sage Software, Inc.
(301) 230-3200
APS Application Dictionary

APS Application Dictionary is a centralized repository and control point responsible for integrating data from all APS product groups. The product runs on IBM's MVS, MVS/XA, VM and PC-DOS, with independent Cobol or Cobol II applications generated for IBM data base management and data communications systems including DB2, IMS, VSAM and CICS.

Source codes, data base descriptions, report and screen layouts, application system entities and user-developed macro instructions are automatically stored and maintained within the system. A batch facility includes summaries and documentation of program specifications, prototype documentation and data base and file reports. On-line Help functions provide on-screen Help panels and generate error messages.

Cullinet Software, Inc. IDMS support is available through the Macro Facility.

Tata Consultancy Services (a division of Tata Sons Ltd.)
(212) 557-9038
Casepac

Casepac, an advanced data dictionary for IBM mainframe environments, supports 22 categories of data belonging to the conceptual, logical and physical models of systems. Users interface with Casepac in an on-line mode through screens and commands with IBM's ISPF and DB2 for data base management functions.

The dictionary aids in documentation, system integrity checks, data consistency and security. The Casepac data base can be built up by automatic extraction of information from existing systems or by user inputs for new systems.

Technology Information Products Corp.
(617) 273-5518
Tip Repository

Tip Repository supports data administration and information resource management functions within the organization, providing dictionary capabilities independent of any specific data base management system while providing the necessary DBMS interfaces.

Tip Repository provides on-line data entry and update capabilities as well as a Convert facility for direct dictionary entry from existing systems such as Cobol data divisions or DBMS control blocks. The product maintains an inventory of programs, systems, files, screens, users and records for the MIS organization, including update, inquiry and report capabilities. The product was designed for IBM, Honeywell Bull, Inc. and Unisys Corp. mainframe systems.

Texas Instruments, Inc.
(703) 849-1400
Information Engineering Facility

The Information Engineering Facility (IEF) being developed by TI was designed to be a fully integrated set of tools for systems development and maintenance. The architecture provides five integrated tool sets for planning, analysis, design, code and data base generation.

The operating environments for IEF mainframe components running on IBM's MVS are IBM's DB2, TSO and ISPF Version 2. Workstation components include IBM's PC-DOS or Microsoft Corp.'s MS-DOS 3.0 and higher, TI's Business Pro and IBM Personal Computer ATs and compatibles. Micro-to-mainframe communications are supported using Digital Communications Associates, Inc. Irma cards.

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DEC VAX	$30-45K
COBOL DB2	$30-45K

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650 Woodfield Dr. #735
Schaumburg, IL 60173

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Immediate openings in Ohio, Indiana and Michigan for P/A's with any of the following skills:

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We offer an excellent benefits package, including short/long term disability, hospitalization, vision, dental, vacation and 401K. Forward resume, including salary requirements to:

AZTEC
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DATA BASE ADMINISTRATOR/SYSTEM MANAGER

Non profit association at Chicago O'Hare location seeks individual to manage newly established in-house data processing dept. Position involves modifying and managing in-house data base system, administering systems operations and training association users. The successful candidate should have 4 years DP experience, including programming and data base administration. Bachelor's Degree required. Experience with HP 3000 and HP Rapid e plus. Send resume with salary requirements to:

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It's easy to advertise in COMPUTERWORLD. If you don't have an advertising agency to supply us with copy, layout and order, or a camera ready mechanical, stat or film negative of your ad, just call one of our ad-takers at 1-800-343-6474. They will be glad to take your ad and typeset it in available fonts at no extra charge. If you have lengthy ads that require logos and artwork, just send a clean typewritten copy of your ad to the classified advertising department at COMPUTERWORLD (telecopier service is available): note the ad size you want; and, if you want your company logo to appear in your ad, please be sure to include a camera-ready copy with your insertion order. You should also supply any special borders, headlines and artwork that you want in your ad. Our Production Department will follow your suggested layout as closely as possible if you wish to send one.

Ad closing is every Friday, 6 working days prior to issue date.

Rates: Open rate is $176.40 per column inch. Minimum ad size is 2 columns inches (1 column wide by 2 inches deep), and costs $352.80 per insertion. Additional space is available in half-inch increments. Per agate line the cost is $12.60.

Discounts are available when you run more than 35 column inchs of advertising in a year anywhere in Computerworld. Box Numbers are available, $15.00 per insertiun.

To reserve space for your ad, or if you'd like more information on Classified Advertising in COMPUTERWORLD, call our office.

(617) 879-0700
or
(800) 343-6474
TELECOPIER SERVICE
extensions 739 - 740

COMPUTERWORLD's COMPUTER CAREERS!

As the industry grows, so will **COMPUTERWORLD.** This is not a phrase we took lightly. We will continue to offer the high quality news coverage and editorial content that has attracted our readers since our beginning. But we also must continue to grow. What does that mean to you, our advertisers? Good news...in the form of wide exposure. We now will offer a feature topic to each weeks Recruitment ads. This will allow for us to target your specific market. In addition to the attractive format, it is easy to read. We offer a variety of topics which we have listed below:

SEPT.

9/21 Opportunities in the health field industry

9/28 Planning an MIS Career Path
SHOW DISTRIBUTION:-
TCA & INFO '87

OCT.

10/5 Opportunities in Finance and Investment

10/12 Contracting Advantages/ Disadvantages

10/19 Running MIS for the Airline Industry

10/26 Unethical vs Ethical ways to get a job
SHOW DISTRIBUTION: UNIX Expo

So, as a nationwide publication, we give you the exposure you want. As a weekly publication, we give you the immediacy your advertisements need.

COMPUTERWORLD publishes every Monday with an ad deadline of 10 days prior to each issue date. You may send in copy to be pubset or camera-ready material (velox or negative) via the mail. We provide telecopier service and will also take ads over the phone. We now have an answering machine which will take your calls/reservations even after business hours on the east coast. Please call either number listed below and indicate you would like Classified Advertising and you will be immediately connected to the machine. It's as easy as that!

Our mailing address is

COMPUTERWORLD

Classified Advertising
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375 Cochituate Road
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01701-9171

Or call for more information at

1-800-343-6474 or,

in Massachusetts, **(617) 879-0700**

Announcing

IDG COMMUNICATIONS

COMPUTER CAREERS NETWORK

It's new!
And it's your key to reaching the right people in the right places at the right price.

As the world's largest publisher of computer-related newspapers, only IDG Communications can give you this unique method of targeting your recruitment advertising to the professionals you want to reach, where you want to reach them.

You choose the newspapers. There are eight computer and communications-oriented newspapers in the network, reaching every type of computer and communications professional. Depending on who you are looking for, you can choose the publications that suit your needs.

You choose the region. You can advertise nationally in any one newspaper at regular rates, or any combination of publications at special rates. Or you can choose to concentrate in one or more of three regions — East, Midwest and West. You automatically get a three-newspaper buy, *Computerworld*, *InfoWorld* and *Network World*. Then you can add on one or more other publications. For example, if you are in the Boston area, you might want to add the Boston edition of *Computer Currents*. Or if you are looking for a VAX programmer in the Midwest, you may want to add Digital News Midwest edition.

You don't have to pay for readers you don't want. When you advertise in the Sunday paper, most of the people you are reaching have nothing to do with computers. But you have to pay for them anyway, since rates are based on total circulation. The Computer Careers Network rates are also based on total circulation, but all of that circulation and readership are computer or communications-involved professionals.

You can reach professionals who aren't actively looking. Our research indicates that roughly 10% of computer professionals may be actively looking for a job at any given time. The other 90% will not be reading the Sunday classifieds. But more than half of computer professionals would consider other job options at any given time if they became aware of them, and those are the hidden stars that you can reach in the pages of their professional newspapers — the ones they read for the information they need to stay ahead.

Circulation plus projected pass-along audience

	EAST	MIDWEST	WEST	TOTAL U.S.
[redacted]				
Subtotal	**573,358**	**405,542**	**311,174**	**1,290,074**
Digital News	106,468	52,252	53,280	212,000
Federal Computer Week	74,412	20,883	25,083	120,378
Computer Currents				
Northern California Edition			225,000	225,000
Southern California Edition			234,000	234,000
Boston Edition	120,000		120,000	
Total	**874,238**	**478,677**	**848,537**	**2,201,452**

Special low introductory offer – $8.00 per line!

Regional Buys

Here's how to place your recruitment advertising regionally:

The basic recruitment "package" automatically delivers your advertisement in three leading computer newspapers — *Computerworld*, *InfoWorld*, and *Network World* — AND in the region of your choice. Whether you choose the East, West, or Midwest, you pay just **$8.00 per line.** And if you want, you can add a second region to your three-book buy for a total cost of **$15.00 per line.**

This basic package includes three of the eight newspapers available to you through the IDG Communications Computer Careers Network. You can also schedule *Digital News*, *Federal Computer Week* and *Computer Currents* (Northern California, Southern California, or Boston edition) — to help you reach all the right people in all the right places.

Regional Combination Buys

	1 REGION	2 REGIONS
[redacted]		
PLUS		
1 addition	$10.00	$17.00
2 additions	$12.00	$19.00
3 additions	$14.00	$21.00
4 additions	$15.00	$22.00
5 additions	$16.00	$23.00

Please note: This special introductory offer is valid only through December 31, 1987. Individual contract rates do not apply, and no lower rate is available.

National Buys

And here's how you can buy nationally to get the maximum reach possible:

Sometimes you need national exposure for your recruitment advertising. That's when you can put these advertising opportunities to work for you.

Combination buys. These special combination buys allow you to recruit computer professionals nationally using the combination of newspapers that's right for you.

Choose from *Computerworld*, *InfoWorld*, *Network World*, *Digital News*, or *Federal Computer Week*.

National Combination Buys

	RATES PER LINE[1, 2]
Combination of 2	$15.00
Combination of 3	$17.00
Combination of 4	$19.00
Combination of 5	$20.00

1) *Computerworld* contract advertisers — Determine your discounted line rate by deducting the difference between *Computerworld's* open line rate and your current contract rate from the above combination rates.

Example:

$12.60 open line rate
− 11.35 contract rate
$ 1.25 difference

Your discounted rate of a combination of two publications would be $15.00 − $1.25 = $13.75.

2) If your combination buy does not include *Computerworld*, your Computer Careers national rate may be lower. To calculate, start by adding the stand-alone rates of the respective publications (*InfoWorld* — $9.29, *Network World* — $5.00, *Digital News* — $5.00, *Federal Computer Week* — $3.60). Then deduct 10% from the total.

Example:

$ 9.29 InfoWorld
+ 5.00 Network World
$14.29 Total
− 1.43 less 10%
$12.86 discounted rate

To put the IDG Communications Computer Careers Network to work for you, call the sales office nearest you — or contact John Corrigan, Recruitment Advertising Sales Director, at 617-879-0700. Just one quick phone call can give you all the information you need on running your recruitment advertising — regionally or nationally — in up to eight leading industry newspapers.

Computerworld, a weekly newspaper with a total audited reach of more than 650,000 (U.S.) computer-oriented professionals, carries more recruitment advertising than any other specialized business publication. Every week, it delivers the latest news to information systems executives and specialists at medium to large organizations, as well as the executives at the computer industry vendor organizations that serve them. Its readers include MIS directors and managers, systems analysts, programmers, sales and marketing professionals and other computer-involved executives.

InfoWorld is the weekly newspaper edited for personal computer professionals at organizations using multiple systems. It has a total audience (subscribers and pass-along readers) of 420,000, including PC managers, software developers and other PC-oriented professionals.

Network World is the news and features weekly for larger users of communications and networking. Its 220,000 readers (including subscribers and pass-along readers) include voice and data communications managers and specialists as well as communications consultants.

Digital News is a biweekly newspaper for computer professionals who work with the VAX line of computers from Digital Equipment Corporation. Total readership, including subscribers and pass-along readers, is over 210,000, including computer executives and managers, systems analysts, programmers, engineering executives and staff, and other VAX-oriented computer professionals.

Federal Computer Week is edited for information systems executives and staff who work in and sell to the federal government. Its weekly circulation includes MIS executives and managers, as well as systems analysts, programmers, software developers, communications specialists and other information systems professionals. Total readership (including paid and pass-along) exceeds 120,000.

Computer Currents is a group of regional publications edited to meet the needs of business and professional users of personal computers in the region covered.

Computer Currents/Northern California Edition is published biweekly and has a total circulation of 75,000. Total readership exceeds 225,000.

Computer Currents/Southern California Edition is published monthly and has a total circulation of 78,000, with a total readership of 234,000.

Computer Currents/Boston Edition covers the entire eastern Massachusetts and southern New Hampshire area with a monthly circulation of 40,000 and total readership of 120,000.

Experienced Software Developers

LAI has immediate openings for you using System V and/or 4.3BSD UNIX® operating systems. Our current porting projects involve: super-computer, multi-processor and supermicroprocessor systems.
Projects you can contribute to include:

- A UNIX® port to multiprocessor supercomputer class machine;
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- NFS™ Product development for System V, VMS, and other systems and;
- Product development of STREAMS TCP and other protocols.

These positons require 3 years of UNIX/C programming with specific experience in: Kernel programming (System V and/or 4.3BSD), development and/or support of network protocols, and System V STREAMS.

Opportunities also exist for experienced project leaders in these areas.

For consideration, send your resume to:

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NFS is a trademark of Sun Microsystems

LIAISON ENGINEER

McDonnell Douglas, Computer Systems Company, a leader in the computer industry, is interviewing candidates for the position of **Liaison Engineer** in our Manufacturing Services Group. Responsibilities will include interfacing technically between a development organization in Northern California and our Irvine manufacturing facility, with primary focus on new products. Travel will be required.

Candidates with the following qualifications will receive first consideration:

- BSEE/equivalent
- Minimum 5 years experience in sustaining engineering or design engineering function.
- Thorough understanding of logic design
- Ability to interact well with both engineering personnel and factory technicians

Other important qualities include:

- Some software experience (network S/W a plus)
- Understanding of power system and mechanical packaging issues helpful
- "Generalist" background

McDonnell Douglas provides a competitive salary and excellent benefits. Please send your resume with salary history to: **McDonnell Douglas Computer Systems Company, Attn: Mary K. Dana, 17426 Daimler, Irvine, CA 92714.** Equal Opportunity Employer.

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Provides systems analysis and design, assists management in the planning of automation requirements, functions as a project leader providing technical leadership and provides a link between Users and data processing dept. A computer-related degree and a minimum of 2 years experience as a Financial Systems Analyst using COBOL and HP 3000 is required. COGNOS and College/University experience preferred.

Salary commensurate with experience. Excellent benefits package. Send resume and salary history in confidence to:

Embry-Riddle Aeronautical University
Office of Human Resources
Spruance Hall
Daytona Beach, FL 32014
904-239-6145

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All of these positions require a degree in one of the following areas: Computer Science, Electrical Engineering, or Mathematics.

Software Engineering Specialists

Positions require three or more years experience in software systems engineering and/or software engineering applications. Candidates must possess experience in the use of DEC/VAX series computers and the PASCAL language. Experience with ADA and "C" language and/or RDBMS is a plus.

VAX Systems Manager

Position requires two or more years experience with VAX/VMS systems management, VAXCLUSTERS, networking and systems programming. Responsibilities will include system installations/upgrades, performance monitoring/tuning, software problem determination, program project and user applications, support. Experience in UNIX and/or graphics workstations is desirable.

CRAY Systems Programmer

Position requires one or more years experience in programming and systems support using CRAY, ALLIANT or SUN equipment. This Systems Programmer will be responsible for generation and maintenance of UNIX based operating systems in a multiple CPU environment, as well as, performance measurement, software problem determination, program product support, and limited user application support.

Senior Software Engineers

Positions require two or more years experience in real time signal processing, test systems software and DoD-STD-2167. Candidates should possess experience in the use of one or more of the following systems: DEC/VAX, HP-1000 and 1750A. Experience in use of ADA, FORTRAN, ASSEMBLY (1750A) languages is highly desirable.

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Positions require one or more years experience using TAL or other structured program languages such as PASCAL, PL1, or "C". Experience using tandem or other fault tolerant architecture is desirable. Other disciplines required include communications interfaces, data base design, system/resource control, and applications software development.

ATE Software Engineers

Positions require two or more years experience with ATLAS and experience in "C" is desirable. This individual must possess the ability to design, implement, and integrate the test programs which will run on GSE to verify the operation of "state-of-the-art" aircraft avionics systems. Experience using the HP-1000 and/or HP-9000 is a plus.

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Full-time permanent position for a researcher in the field of computer communications. Primary responsibilities including design, specification and development of new communication techniques to support the communication requirements of factory automation. It includes active participation in the development and specification of national and international standards for computer communications and the prototyping and verification of such standards in a factory floor environment. Additionally, assistance is provided in the development of software tools and systems in support of the company's communication research. Masters degree in computer science or computer engineering required. Other requirements include one course in each of the following: computer graphics, robotics application, data telecommunication and software engineering. Salary: $27,504 per year. Send resume to 7310 Woodward, Room 415, Detroit, MI 48202, refer to #49087. Employer paid ad.

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The Medical Center of Central Georgia seeks an individual to manage our systems and programming areas of the Information Systems Department. IBM equipment, Technicon patient care system, COBOL financial system in place. This position requires a bachelor's degree with 2 years senior systems analyst experience, 4-5 years systems analyst/programming experience, and 2 years supervisory experience. Reports directly to the Director of Information Systems. Excellent salary and benefits. Forward resume to Personnel Department, Medical Center of Central Georgia, P.O. Box 6000, Macon, GA 31208

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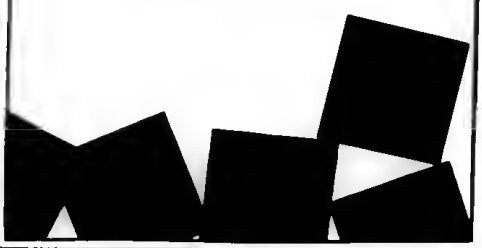

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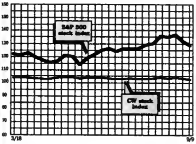

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Peripherals & Subsystems	114.1	111.4
Leasing Companies	118.8	115.3
Composite Index	103.4	102.7
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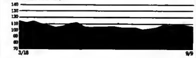

Computer Systems

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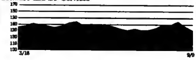

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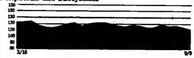

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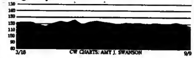

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Communications and Network Services

EXCH		52 WEEK RANGE (1)		PRICE CLOSE SEPT 9 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	100	77	93.13	+1.5	+1.6
Q	ANDREW CORP	16	14	15.00	-1.0	-6.3
Q	ARTEL COMM CORP	6	2	2.63	+0.1	+5.0
N	AT&T	35	22	32.25	-0.6	-2.8
Q	AVANT GARDE COMP INC	7	3	5.25	-0.1	-2.3
Q	AVANTEK INC	18	13	14.25	-0.6	-4.2
N	AYDIN CORP	38	18	33.13	+0.0	+0.0
N	BELL ATLANTIC CORP	77	63	73.88	+0.4	+0.6
N	BELLSOUTH CORP	44	30	39.63	-0.6	-1.6
Q	BRIDGE COMMUNICATION	37	11	28.50	+1.0	+3.9
Q	COMPRESSION LABS INC	12	4	6.50	+0.0	+0.0
Q	COMPUTER NETWORK TECH	6	2	3.13	-0.6	-7.4
Q	CONTEL CORP	40	27	35.88	-0.6	-2.4
Q	DATA SWITCH CORP	9	6	7.13	+0.1	+1.8
Q	DIGITAL COMM ASSOC	45	18	41.25	+1.8	+4.4
Q	DYNATECH CORP	44	37	30.25	-0.6	-1.6
Q	EQUATORIAL COMM CO	6	2	3.13	+0.0	+0.0
Q	GANDALF TECHNOLOGIES	11	6	6.50	-0.6	-10.3
Q	GENERAL DATACOMM INDS	14	6	7.63	-0.5	-6.3
N	GTE CORP	45	34	41.13	-0.6	-0.6
Q	INFOTRON SYS CORP	12	7	6.75	-0.3	-2.6
N	ITT CORP	66	47	61.88	-1.1	-1.8
N	M A COM INC	16	12	15.00	+0.0	+0.0
Q	MCI COMMUNICATIONS CORP	10	6	6.75	-0.1	-1.4
Q	MICOM SYS INC	16	10	12.00	-1.4	10.3
Q	NETWORK SYS CORP	16	8	10.00	-0.8	-7.0
N	NORTHERN TELECOM LTD	24	14	21.88	-0.6	-3.3
Q	NOVELL INC	37	10	22.25	+1.8	+8.1
N	NYNEX CORP	77	66	71.88	+1.0	+1.4
N	PACIFIC TELESIS GROUP	32	23	28.75	-0.1	-0.4
N	PARADYNE CORP	8	4	7.25	-0.4	-4.9
A	PENRIL CORP	6	4	4.63	+0.1	+2.8
N	PLESSEY PLC	41	24	30.81	-0.7	-2.2
N	SCIENTIFIC ATLANTA INC	30	6	17.63	-0.6	-3.4
N	SOUTHWESTERN BELL CORP	42	33	38.25	+1.0	+2.8
Q	3 COM CORP	24	6	16.25	+0.6	+3.4
N	TIMEPLEX INC	41	16	26.88	-3.1	-10.4
Q	UNGERMANN BASS INC	16	7	6.25	-0.4	-2.8
N	U S WEST INC	59	45	54.75	-0.6	-1.1

Computer Systems

EXCH		52 WEEK RANGE (1)		PRICE CLOSE SEPT 9 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	37	15	17.00	-0.6	-4.2
Q	ALPHA MICROSYSTEMS	7	3	4.88	-0.1	-2.8
Q	ALTOS COMPUTER SYS	17	10	12.25	-0.6	-6.9
A	AMDAHL CORP	45	16	40.63	-1.6	-4.4
Q	APOLLO COMPUTER INC	35	11	20.13	-0.6	-2.4
Q	APPLE COMPUTER INC	58	16	52.75	+0.6	+1.4
N	BOLT BERANEK & NEWMAN	30	18	21.00	-0.3	-1.2
Q	BRITTON LEE INC	8	3	3.50	-0.4	-9.7
N	COMPAQ COMPUTER CORP	60	14	56.75	-1.5	-2.8
Q	COMPUTER AUTOMATION INC	17	2	14.00	+0.6	+5.7
A	COMPUTER CONSOLES INC	12	6	5.88	-0.6	-6.6
Q	CONCURRENT COMP CORP	24	13	20.00	-1.5	-7.0
N	CONTROL DATA CORP DEL	37	24	33.50	-2.1	-6.0
Q	CONVERGENT TECH	12	4	7.13	-0.6	-8.1
Q	CONVEX COMPUTER CORP	22	6	14.50	+0.1	+0.9
N	CRAY RESH INC	136	66	96.63	-7.8	-7.8
Q	DAISY SYS CORP	13	7	7.00	+0.0	+0.0
N	DATA GEN CORP	36	28	30.88	-0.8	-2.4
N	DATAPOINT CORP	8	4	6.13	-0.6	-9.9
N	DIGITAL EQUIP CORP	186	66	182.00	-5.6	-3.1
N	FLOATING POINT SYS INC	17	6	8.13	-0.6	-2.7
N	GOULD INC	35	16	21.63	-0.6	-3.8
N	HARRIS CORP	43	37	37.00	+0.0	+0.0
N	HEWLETT PACKARD CO	66	37	64.00	-1.1	-1.7
N	HONEYWELL INC	91	58	84.25	-0.5	-0.6
N	IBM	175	116	157.25	-5.3	-2.3
Q	INFORMATION INTL INC	17	13	12.75	-0.6	-5.9
Q	IPL SYS INC	3	2	3.00	+0.3	+6.1
Q	MASS COMPUTER CORP	12	5	10.30	-0.3	-2.3
N	MATSUSHITA ELEC INDL LTD	178	93	170.00	+8.0	+5.8
Q	MEGADATA CORP	7	2	5.50	-0.3	-4.2
Q	MENTOR GRAPHICS CORP	37	13	34.50	+0.0	+0.0
N	MAI INC	14	6	11.38	+0.0	+0.0
N	NCR CORP	87	42	80.50	-1.0	1.2
N	PRIME COMPUTER INC	31	16	26.13	-1.3	-4.6
Q	PYRAMID TECHNOLOGY	12	4	7.75	-0.6	-8.1
Q	STRATUS COMPUTER	41	18	28.75	-0.6	-1.7
Q	SUN MICROSYSTEM INC	46	13	37.38	-0.6	-1.6
Q	SYMBOLICS INC	1	4	4.25	-0.1	-2.9
N	TANDEM COMPUTERS INC	36	16	36.75	-0.6	-0.8
N	TANDY CORP	66	31	45.88	-1.4	-2.8
N	ULTIMATE CORP	33	13	30.00	-1.1	-2.8
N	UNISYS CORP	46	22	41.30	-2.0	-4.6
A	WANG LABS INC	16	11	17.50	-0.6	-3.4

Software & DP Services

EXCH		52 WEEK RANGE (1)		PRICE CLOSE SEPT 9 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ADVANCED COMP TECH	8	3	3.63	+0.8	+7.4
N	ADVANCED SYS INC	28	12	37.75	+0.3	+0.9
N	AGS COMPUTERS INC	22	8	19.50	-0.3	-1.3
Q	AMERICAN MGMT SYS INC	18	7	17.38	+0.8	+4.8
Q	AMERICAN SOFTWARE INC	22	8	12.63	-1.4	-9.6
N	ANACOMP INC	11	3	8.13	-0.6	-2.7
Q	ANALYSTS INTL CORP	6	3	7.75	-0.3	-3.1
Q	ASHTON TATE	30	13	24.25	+0.0	+0.0
Q	ASK COMPUTER SYS INC	17	10	14.00	-0.6	-4.3
Q	AUTODESK INC	34	10	37.00	+0.0	+0.0
N	AUTO DATA PROCESSING	60	30	49.25	-0.1	-0.3
Q	BOOLE & BABBAGE INC	12	4	10.00	+0.0	+0.0
N	COMPUTER ASSOC INTL INC	33	16	30.25	+0.4	+1.3
Q	COMPUTER HORIZONS CORP	15	10	11.25	-0.1	-1.1
N	COMPUTER SCIENCES CORP	66	30	58.75	-2.8	-4.1
N	COMPUTER TASK GROUP INC	16	11	13.38	+0.1	+0.9
Q	COMSHARE INC	36	11	23.00	-2.0	-8.0
N	CULLINET SOFTWARE INC	14	8	12.88	-0.6	-4.9
Q	CYCARE SYS INC	12	7	9.25	-0.6	-2.6
Q	DUQUESNE SYS INC	33	12	16.25	+0.0	+0.0
Q	ENDATA INC	15	6	13.88	-0.6	1.8
N	GENERAL MTRS (CLS E)	46	24	46.00	-1.0	-2.1
Q	HOGAN SYS INC	17	6	8.38	-2.6	-23.9
Q	INFORMIX CORP	22	7	21.75	+1.3	+6.1
Q	INTELLICORP INC	11	4	7.13	+0.1	+1.8
Q	KEANE INC	10	5	7.50	+0.4	+5.3
Q	LOTUS DEV CORP	37	11	28.75	-2.4	-7.8
Q	MANAGEMENT SCI AMER	21	11	13.00	-0.4	-2.8
Q	MICRO PRO INTL CORP	6	2	5.31	-0.1	-2.3
Q	MICROSOFT CORP	136	28	112.75	-2.3	-2.0
Q	NATIONAL DATA CORP	34	17	31.75	-0.6	-1.6
Q	ON LINE SOFTWARE INTL INC	22	6	20.00	-0.6	-3.0
Q	ORACLE SYS CORP	30	7	25.38	1.1	-4.2
N	PANSOPHIC SYS INC	22	12	21.00	+0.8	+3.4
Q	POLICY MGMT SYS CORP	30	18	23.00	-1.8	-7.1
Q	PROGRAMMING & SYS INC	13	6	12.75	+0.8	+6.3
Q	REYNOLDS & REYNOLDS CO	39	27	33.75	-1.8	-4.9
Q	SEI CORP	18	6	16.00	+0.0	+0.0
Q	SHARED MED SYS CORP	53	25	36.63	-1.5	-5.3
Q	SOFTWARE AG SYSTEMS INC	16	10	12.63	-0.8	-5.6
Q	SOFTWARE PUBG CORP	17	6	6.50	-0.1	1.3
A	STERLING SOFTWARE INC	17	8	8.00	-0.9	-9.9
Q	SUNGARD DATA SYS INC	21	16	17.00	-0.6	-4.2
Q	SYSTEMATICS INC	30	14	26.25	-0.8	2.8
N	UCCEL CORP	52	30	0.00	30.0	-100.0
N	URS CORP	30	12	18.13	-0.6	-2.3
Q	VM SOFTWARE INC	45	15	18.25	-1.6	-7.1

Semiconductors

EXCH		52 WEEK RANGE (1)		PRICE CLOSE SEPT 9 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	25	13	20.13	-0.9	-2.4
N	ANALOG DEVICES INC	24	14	19.38	1.4	-6.9
Q	ANALOGIC CORP	13	10	12.00	+0.1	+1.1
Q	INTEL CORP	60	18	53.13	+1.1	+2.2
Q	LSI LOGIC CORP	17	6	12.63	+0.0	+0.0
Q	MONOLITHIC MEMORIES INC	16	10	0	-10.0	-100.0
N	MOTOROLA INC	72	34	64.25	+0.0	+0.0
N	NATL SEMICONDUCTOR	17	8	16.50	-0.1	-0.8
N	TEXAS INSTRS INC	75	35	70.00	-1.5	-2.1
A	WESTERN DIGITAL CORP	33	13	23.88	-2.8	-9.9

Peripherals

EXCH		52 WEEK RANGE (1)		PRICE CLOSE SEPT 9 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTL INC	6	8	7.25	-0.4	-4.9
Q	AST RESH INC	28	11	15.88	-0.1	-0.7
Q	AUTO TROL TECH CORP	6	3	5.88	-0.1	-2.1
Q	BANCTEC INC	18	6	11.50	-0.8	-6.3
Q	CIPHER DATA PRODS INC	16	6	10.88	+0.8	+7.4
A	COGNITRONICS CORP	6	2	4.00	+0.0	+0.0
N	COMPUGRAPHIC CORP	36	16	25.25	+0.8	+3.1
N	COMPUTERVISION CORP	23	13	14.25	-0.4	-2.6
N	CONRAC CORP	30	12	0.00	+0.0	+0.0
A	DATAPRODUCTS CORP	16	10	11.13	+0.0	+0.0
A	DATARAM CORP	6	7	7.25	+0.0	+0.0
N	DECISION INDS CORP	13	7	11.00	-0.3	-2.2
N	EASTMAN KODAK CO	10A	52	96.38	-0.1	-0.1
Q	E M C CORP MASS	39	7	24.25	-2.8	-10.3
Q	EMULEX CORP	10	6	7.50	-0.1	-1.6
Q	EVANS & SUTHERLAND	40	30	30.25	-0.6	-1.8
Q	ICOT CORP	13	5	5.00	+0.0	+0.0
Q	INTERLEAF INC	35	8	17.75	-0.8	-4.1
Q	IOMEGA CORP	10	2	2.88	+0.0	+0.0
Q	LEE DATA CORP	10	5	5.63	+0.1	+2.3
Q	MASSTOR SYS CORP	6	3	4.38	-0.3	-6.7
Q	MAXTOR CORP	34	11	11.50	-1.5	-11.5
Q	MICROPOLIS CORP	44	14	23.88	-1.4	-2.8
Q	MINISCRIBE CORP	16	5	13.00	-0.6	-4.9
N	MINNESOTA MNG & MFG CO	84	50	75.38	-2.8	-3.5
A	MSI DATA CORP	23	10	20.30	1.0	-4.7
Q	PRIAM CORP	6	2	3.00	-0.1	-4.0
Q	PRINTRONIX INC	14	10	11.00	-0.1	1.1
N	QMS INC	35	11	21.88	-0.6	-2.3
Q	QUANTUM CORP	35	16	17.00	-0.6	-4.2
Q	RAMTEK CORP	6	4	9.35	+0.1	+2.4
N	RECOGNITION EQUIP INC	37	12	16.75	-0.9	-4.3
Q	REXON INC	14	8	8.25	-0.8	-8.3
Q	SCAN TRON CORP	17	11	11.75	-0.9	-6.9
Q	SEAGATE TECHNOLOGY	46	13	38.63	-1.8	-5.0
N	STORAGE TECH CORP	8	2	2.88	-0.1	-4.3
Q	TANDON CORP	7	3	3.50	-0.3	-6.7
A	TEC INC	7	3	4.63	+0.1	+2.8
N	TEKTRONIX INC	63	30	37.63	-0.1	-0.3
Q	TELEVIDEO SYS INC	3	2	2.94	+0.1	+2.3
N	TELEX CORP	102	36	67.90	-2.0	-2.9
Q	WYSE TECH	39	13	33.25	-0.6	-1.8
N	XEROX CORP	65	61	76.00	-2.8	-3.5
Q	XIDEX CORP	17	11	11.38	+0.3	+2.2

Leasing Companies

EXCH		52 WEEK RANGE (1)		PRICE CLOSE SEPT 9 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	36	15	31.00	-2.1	-6.4
N	CONTINENTAL INFO SYS	14	7	10.25	-0.6	-5.7
Q	PHOENIX AMERN INC	6	3	4.63	+0.3	+6.7
Q	SELECTERM INC	7	6	5.00	-0.6	-4.9
N	U S LEASING INTL	50	40	48.00	-1.6	-3.5

EXCH: N=NEW YORK; A=AMERICAN; Q=NATIONAL, O=OVER-THE-COUNTER; S=SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) 30 NEAREST DOLLAR

Hogan's no hero

Hogan Systems anticipates quarterly loss; stock plummets

In the midst of one of the software industry's most impressive turnarounds in years, Hogan Systems, Inc. recently dropped a major bombshell, saying it anticipates a loss for the current quarter ending Sept. 30. Wall Street was not pleased.

Last week, the price of Hogan's over-the-counter stock continued the slide that began Sept. 4, when Hogan made its surprise announcement. On that day, the firm's stock plunged by nearly 20%, falling 2⅛ points to 8⅝.

After Labor Day, Hogan continued to slip. Hovering at or near its low trading point of the past year, Hogan dropped an additional three-eighths of a point in three trading days to close Thursday at 8½.

Digital Equipment Corp., proving that an overall market decline has more effect than fanfare does, fell 3⅛ points to 182⅛ last Tuesday as Decworld '87 opened in Boston but rebounded, rising 7¼ points Thursday to close at 189¼.

In other stock market action, Micropro International Corp.'s stock jumped 1 1/16 Thursday. With the stock closing at 5 5/16 Wednesday, the jump was almost 20%.

CLINTON WILDER

Behind the scenes at DEC's show of shows

BY SUZANNE WEIXEL
CW STAFF

BOSTON — With all the grace of the massive cruise ship *Queen Elizabeth 2* being tugged into narrow Boston Harbor, Decworld '87, Digital Equipment Corp.'s international customer event, got under way last Tuesday.

When DEC President and Chief Executive Officer Ken Olsen flipped the switches to turn on the Network Management Center, the lights lit up, the monitors came to life, and the show was launched. Olsen admitted that the wires had been checked and the system powered up earlier. After all, he said, "We're confident, but not *that* confident."

Considering the sheer magnitude of the show, both caution and bravado were in order, particularly for attendees.

The exhibit space alone consists of 120,000 sq ft in Boston's harbor-side World Trade Center, complemented by hotel and conference space in the *QE2* and the *Oceanic* liner.

With more than 120 sessions and 40 special events scheduled to take place throughout the pier-front facilities, attendees found themselves walking seemingly endless miles just to get to the show floor — in many cases, immediately after sitting in interminable traffic jams driving through town.

Activities planning

Planning for Decworld started a year ago, according to Dallas Kirk, program manager for the show. In all, be said, about 25,000 DEC employees contributed to the exposition. DEC first started converting the World Trade Center into a DEC showroom Aug. 1, installing the computers — 490 of them — in about 10 days.

The *QE2 docks in Boston* *er for Decworld '87.*

The objective of the show, Kirk said, was to provide an opportunity for customers to see DEC's "network at work" in an atmosphere of a standard DEC customer/sales representative visit.

In addition to organizing the show sessions and displays around what Olsen referred to as "elegant solutions for specific customer problems," each customer was accompanied by his sales representative for the duration of his visit.

Planned activities

In an attempt to keep chaos at bay, most of the expected 27,000 by-invitation-only customers were encouraged to plan in advance what they would do at Decworld, Kirk said.

Working with their sales representatives, they examined their companies' specific needs and determined which seminars, exhibits and demonstrations would benefit them most.

Meanwhile, customers seemed to be proceeding with caution. Attendees from Southwestern Bell Corp. in St. Louis, busy dragging their luggage from one end of the World Trade Center to the other, said they were there primarily for the chance to see all of what DEC can provide, then possibly to consider potential solutions.

Microvaxes

FROM PAGE 1

the Microvax II's 0.9 MIPS.

According to Jesse Lipcon, a DEC corporate consulting engineer, the performance gains were achieved by speeding up the cycle time of the CPU chip from 400 nsec in the Microvax II to 90 nsec in the new models. The new machines use CMOS technology and include 1K byte of on-chip cache memory and 64K bytes of cache on the CPU board. He said Cobol performance was improved by DEC moving six instructions from software emulation into hardware.

Outperformed Model 60

Lipcon claimed the new systems outperformed the 9370 Model 60 in several benchmarks. He said the new Microvaxes beat the 9370 by factors of 1.23 in single-precision Linpacks, 1.12 in double-precision Linpacks, 1.5 in single-precision Whetstones, 1.25 in double-precision Whetstones and 1.9 in Dhrystones.

Analysts and DEC customers attending Decworld '87 generally praised the announcement.

Michael Geran of the New York investment firm E. F. Hutton & Co. said, "It's good for DEC, and it's good for the customer. It allows DEC to sell price/performance and not just price. The Microvaxes are the equivalent or better when compared with the 9370 Model 60, at a lower price. How much better is it? We'll see."

DEC played out the "gutsy scenario," according to analyst Bob Randolph of the Framingham, Mass., market research firm International Data Corp. He said the safe strategy would have been to cripple the Microvax 3500 and 3600 so they only performed at about 1.5 MIPS. Now, be said, DEC is providing more power but is "taking a chance on wiping out the 8250 and 8350."

DEC's counteroffer

Third-generation Microvaxes

	DEC Microvax 3500	DEC Microvax 3600	IBM 9375 Model 60	IBM 9377 Model 80
MIPS *	3	3	1.3	2.6
Memory range (in bytes)	16M to 32M	32M	8M to 16M	8M to 16M
Base price	$74,800 (16M bytes)	$99,800 (32M bytes)	$93,000 (8M bytes)	$190,000 (8M bytes)

* Million instructions per second

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Randolph said the price/performance of the new systems "gives DEC a lot more to talk about" in competing with IBM for the departmental systems market.

"The surprise for me is that they are keeping the Microvax II around. It leads me to believe that the Microvax II has become a cash cow for them, and they are not ready to let it go," Randolph added. He noted that the Microvax II has been largely an OEM product and that OEM customers may not be ready to change their product lines along with DEC.

One of the early field-test users of the Microvax 3600 reported that the system showed particularly strong performance gains in memory- and disk-intensive applications.

"Almost everything we saw, whether in development or production mode, pointed right at three times [the performance of] the Microvax II," said Neil Baldridge, vice-president of development for Compu-Share, Inc. in Lubbock, Texas, a third-party supplier of DEC-compatible accounting and distribution software.

"DEC's All-In-1 people said they could put 60 users on it, and I think that is conservative. I can envision a Cobol environment where you would see 100 active users," Baldridge said, adding that Compu-Share frequently supported more than 40 users.

He also noted that Compu-Share gambled by using a field-test processor in production work but that no significant problems occurred.

M&D runs benchmark

In another test, applications vendor McCormack & Dodge Corp. in Natick, Mass., ran a benchmark on a Microvax 3600 at DEC and found that the CPU ran 1½ times faster than the Vaxstation 2000 and 2.7 times faster than the Microvax II.

The benchmark involved running M&D's G/L Plus general ledger system. The test showed that connect time, or overall throughput (from a terminal to the CPU and back), for the Microvax 3600 was 1.8 times better than it was for the two earlier systems, according to Marc Desrosiers, VAX strategic marketing manager for M&D.

However, other DEC customers reported last week that they want more information about the new systems.

"We're looking at it mostly from the development point of view. I'm particularly interested in whether we can upgrade our existing Microvax II. Even if they offer an upgrade path in the next year, that would be nice," said George Conant, vice-president of engineering for Xyplex Corp. in Concord, Mass.

Hank Sulzycki, manager of technical support for Gannett Co.'s offices in Silver Spring, Md., said his company is considering the Microvax 3500 and 3600 for remote locations. "We haven't committed to using them, but we are looking at them. I like the price/performance: a 3-MIPS machine for under $75,000," Sulzycki said.

Memories differentiate new machines

Digital Equipment Corp.'s Microvax 3500 and Microvax 3600, which were announced last week (see story page 1), are said to differ from each other mainly in their memory and disk configurations in addition to cabinetry.

In addition, the systems use disk and tape storage products introduced last week.

The Microvax 3500 is a 27-in.-high pedestal-style system featuring 16M to 32M bytes of memory, one or two 280M-byte RA70 disk drives and a 296M-byte TK70 cartridge tape drive.

The RA70 is the first 5¼-in. disk drive designed and made by the company.

The TK70 effectively replaces the 96M-byte TK50 tape drive.

The Microvax 3600 includes 32M bytes of memory and the TK70 and supports the RA70 as an option. However, the standard disk drive is the new 622M-byte, 14-in. RA82.

The Microvax 3600 is housed in a 41-in.-high cabinet and can be expanded with a second cabinet that houses two additional disk drives and a second tape drive.

Prices for the systems range from $74,800, for a Microvax 3500 with minimum memory and disk and tape storage, to $180,000.

DEC said a limited number of shipments will begin by the end of the year, with volume shipments commencing in 1988.

Jesse Lipcon, a DEC corporate consulting engineer, said there are no technical barriers to upgrading a Microvax II to a Microvax 3500 but said DEC has no immediate plans to offer such an upgrade.

JAMES CONNOLLY

SNADS, Disoss gates top Decworld rollouts

BY PATRICIA KEEFE
CW STAFF

BOSTON — Decworld '87 attendees in search of a network management system were greeted mostly by a handful of newly enhanced older products bolstered by statements of direction.

"I think what users got was more promises; DEC has a better story to tell," said Francis Dzubeck, president of Communications Network Architects, Inc., a consulting firm in Washington, D.C.

Digital Equipment Corp. did unveil some additions to its network strategy, such as much-needed gateways to IBM's Systems Network Architecture Distributed Services (SNADS) and Distributed Office Support System (Disoss), a distributed naming service and a 10M bit/sec. Ethernet network for unshielded twisted-pair cabling. But many analysts dismissed DEC's "nonannouncement" as disappointing.

DEC's networking presentation highlighted Phase V of the company's Digital Network Architecture (DNA). First announced in 1985, DNA will move the first four Decnet layers into compliance with the comparable layers of the ISO's Open Systems Interconnect (OSI) model.

The following were among the products unveiled:

- Decnet System Services (DSS), a set of layered networking software products said to enable users to access information on remote computers using remote disks and printers in a networked environment.
- Mailbus, a set of distributed applications said to link users of DEC's All-In-1, IBM's SNADS and Disoss and other CCITT X.400-compliant E-mail systems in a global electronic messaging network.
- A 10M bit/sec. OSI-standard Ethernet offering for installations using installed unshielded twisted-pair wiring (see story this page).

DEC's communications announcements focused on providing transparent links between DEC users and non-DEC messaging and computer systems. But it was not enough to impress the analysts.

DEC President Ken Olsen

"All they've done is buy time for themselves, and they are getting as good as IBM at doing that," said Gigi Wang, a senior analyst with The Yankee Group in Boston.

One piece of the puzzle barely addressed by DEC was support for IBM's Netview, which is important to users with DEC minicomputers and IBM mainframes.

"DEC doesn't have anything to counter Netview. It still doesn't have a native-mode implementation of IBM communications like most other vendors do," said John McCarthy, director of research at Forrester Research, Inc. in Cambridge, Mass.

Analysts also criticized DEC's announcement of support for Disoss, claiming most users really need access to IBM's Professional Office System (Profa). "Certainly, DEC customers are screaming for Profs. Perhaps [DEC] feels too strong in the mid-range, so they think they don't have to talk to IBM's mid-range flagship," speculated David Terrie, president of Newport Consulting in Scituate, Mass.

Keeping a commitment made more than two years ago, in July 1985, DNA Phase V (also called Decnet/OSI Phase V) complies with layers one through four of the OSI network model. Phase V is compatible with existing Decnet installations.

Closer to home, DEC's VMS-oriented DSS offering consists of three products: VAX Distributed Name Service (DNS), VAX Distributed File Services (DFS) and VAX Distributed Queuing Service (DQS). The three packages range in price from $250 to $14,400, depending on configuration.

Crucial application

Perhaps the most crucial of the three DSS applications, DNS provides consistent, network-wide naming of resources. DFS reportedly provides VMS users with high-speed, transparent access to files stored on remote VMS systems in a Decnet network. And DQS is said to allow any VMS user on any system within Decnet to access any VMS printer.

Compatible with Decnet/OSI Phase V, Mailbus is an electronic mail service that isolates users from protocols, enabling them to exchange information between local and remote systems without regard for how the information reaches its destination.

Mailbus complies with X.400 and features two gateways: the VAX Message Router/S, which enables All-In-1 or PC All-In-1 and SNADS users to exchange data and documents, and the VAX Message Router, which provides store-and-forward message transfer. The gateways also allow other mail systems to tie into Mailbus. Pricing starts at $1,200.

The Message Router/S gateway reportedly allows IBM electronic-mail users, such as users of IBM's Personal Services/Disoss, to exchange mail messages, documents and Microsoft Corp. MS-DOS files with DEC electronic-mail users across an OSI-compliant network.

The VAX Message Router/S gateway ranges in price from $2,250 to $54,000.

The VAX Message Router consists of three core components: the Message Router Base, containing the message-transfer system, a new gateway directory service and new management services; the Message Router VMS Mail Gateway, which interfaces VMS Mail to the VAX Message Router; and the Message Router Programmers Kit, which provides a set of high-level interfacing routines that allow a systems programmer to write applications to run on the VAX Message Router.

The VAX Message Router provides two key enhancements: improved network management services for automated system management and a configuration procedure that simplifies DEC's low-management-default network.

Pricing ranges from $1,200 to $5,400 for the Message Router Base; from $1,320 to $7,920 for the Message Router VMS Mail Gateway; and from $8,400 to $50,400 for the Message Router Programmers Kit.

Wired up — reluctantly

Digital Equipment Corp. threw its hat into the corporate wiring closet last week and unveiled its own high-speed Ethernet for ordinary telephone wiring.

Speaking at a Decworld '87 press conference, DEC President Ken Olsen exhibited mixed feelings about the latest extension to DEC's family of Ethernet products.

To hear Olsen explain it, DEC is offering 10M-bit Ethernet over unshielded twisted-pair wiring to customers foolish enough to snub coaxial cable. "Coax is so much easier," he said, "but alas, a number of our customers put twisted-pair in their buildings, and they are too embarrassed to take it out; so we've adapted Ethernet to twisted-pair."

There seemed no doubt where DEC's loyalties lay. "That [achievement] doesn't mean it's the best choice. It costs more, it's awkward, it's not as useful, and it has limitations on it," Olsen added.

Initial shipments for DEC's Unshielded Twisted-Pair Ethernet Adapter are slated for January. The adapter utilizes most installed telephone wiring and will connect the vast majority, some 85%, of most desktop devices with operating distances ranging from 50 to 70 meters, DEC said.

Pricing ranges as follows: $1,600 for the Model H3300-AA, a complete starter kit for eight stations; $392 for the Model H3310-AA, an office adapter eight-pack; and $600 for the Model H3330-AA, an eight-pack for the wiring closet and satellite equipment room.

PATRICIA KEEFE

DEC claims edge over Sun, Apollo

BY JAMES CONNOLLY
CW STAFF

BOSTON — While much of the focus at Decworld '87 was on new versions of the Microvax, Digital Equipment Corp. also moved to immediately catch up with Sun Microsystems, Inc. and Apollo Computer, Inc. in the technical workstation market.

As with its earlier Vaxstation II and Microvax II families, DEC built the Vaxstation 3200 and 3500 around the CPU used in the Microvax 3500 and 3600. DEC said the result is an edge in price/performance — particularly when performance is measured in real applications rather than synthetic benchmarks — in comparison with the Sun-3/260, Sun-4 and Apollo DN4000.

"For Digital, I think it is great. For a long time they only had something at the entry level. For the first time they can say they really have a range of systems," said analyst Vickie Brown of Framingham, Mass.-based market research firm International Data Corp. (IDC).

Brown said the price and performance of the new Vaxstations are competitive with the Sun-3/260 and Apollo DN4000, although she declined to give an advantage to any of the three vendors. The Sun-3/260 and DN4000 are rated at 4 million instructions per second (MIPS) by their makers. Analysts rated the new Vaxstations at 3 MIPS, in comparison with the 0.9 MIPS of the older Vaxstation II.

DEC announced an entry-level price of $19,900 for a monochrome diskless Vaxstation 3200 with 8M bytes of memory. A Vaxstation 3500 with eight graphics planes, a 19-in. color display, 16M bytes of memory, software licenses and basic disk and tape storage costs $58,400.

IDC's Brown noted that the Vaxserver announcements may be intended to help DEC show a greater installed base of workstation products. Research firms such as IDC have traditionally counted DEC minicomputers used as servers in the general-purpose, medium-scale market.

Drives fit new Microvaxes

BOSTON — Digital Equipment Corp. wrapped up its Decworld '87 product introductions by announcing the RA70 280M-byte 5¼-in. disk drive, designed specifically for use with the newly unveiled Microvax 3500 and 3600.

DEC also announced the RA82 14-in. 622M-byte Winchester disk drive and the TK70 296M-byte streaming cartridge tape subsystem for use with Q-bus systems. The subsystems are part of the Digital Storage Architecture interface family.

According to F. Grant Saviers, vice-president of Storage Subsystems, the RA70 represents a two-generation leap in DEC's storage technology. The first 5¼-in. disk designed and manufactured by DEC, the RA70 employs thin-film media to yield an area density of 30.4M bit/sq in. It offers an average seek time of 19½ msec and an average access time of 27 msec.

The RA82, similar to DEC's SA482 14-in. hard-disk offering, features an average seek time of 24 msec and an average access time of 32 msec.

A single RA70 comes standard with the Microvax 3500. It is also available as an option for both the Microvax 3500 and 3600 systems for $9,000. A single RA82 comes standard with the Microvax 3600. An optional package of three is available for $65,500.

Firm sued over Lisp Machine crash

Key employees allegedly carried off secrets after deserting at crucial time

BY STANLEY GIBSON
CW STAFF

CAMBRIDGE, Mass. — A suit filed here recently charges that key former employees of Lisp Machine, Inc. illegally used trade secrets to develop an expert system intended to compete with a Lisp Machine program.

The suit also claims that six former employees left the company knowing that when they did, crucial funding for Lisp Machine would be denied, causing the firm to declare bankruptcy.

The suit was filed by Gigamos Systems, Inc. in Lowell, Mass., which acquired the assets of Lisp Machine in June following a bankruptcy proceeding. The defendant is Gensym Corp. in Cambridge, the company founded by six former employees of Lisp Machine, and Edward Fredkin, renowned artificial intelligence pioneer and former professor at MIT.

The former employees and Fredkin are charged with breach of contract, misappropriation of trade secrets, unfair competition and related offenses.

Gensym said it plans to file a countersuit against Gigamos that claims interference by Gigamos with Gensym customers.

Gensym declined to specify what kind of interference it will allege.

A showing of code

Following the filing of Gigamos's suit, the court issued a temporary restraining order that requires Gensym to deliver an unaltered copy of its G2 program to the court. The order otherwise allows Gensym to operate in the ordinary course of business.

William O'Brien, Gigamos's chief operating officer, said he believes the G2 program will show that Gensym used code that is used in Picon, a program he said was developed by Gensym's founders while they were employed at Lisp Machine.

However, Robert Moore, president of Gensym, said he welcomed the chance to present the code in court. "The code is absolutely different. G2 is written in Common LISP. Picon is in Data LISP," he pointed out.

Moore said Gigamos filed the suit because the G2 product was shown at the recent American Association for Artificial Intelligence show in Seattle, where it attracted a lot of attention. "The substance is that we built a competitive product," he said.

A dramatic exit

The suit also alleges that the Gensym founders left Lisp Machine when additional financing to keep the company was pending, knowing that if they left, the financing would not go through. It alleges the departure caused the downfall of Lisp Machine several months later, but Moore claimed that the company did indeed get additional funds, although not as much as it had hoped to receive.

The suit also alleges that the former Lisp Machine employees signed agreements that bound them not to disclose proprietary information. While O'Brien said the agreement covers inventions made for one year after leaving Lisp Machine, Moore said the clause only mandated that proprietary information would be respected.

3Com now supports 10M-bit Ethernet over twisted-pair

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. last week extended its family of 10M-bit Ethernet products by adding support for unshielded twisted-pair wiring.

Three products based on technology co-developed with Digital Equipment Corp. (see story page 125) were unveiled: Pairtamer, Multiconnect and Lanscanner.

All three products are said to support 10M-bit Ethernet over ordinary telephone wire while also allowing network administrators to assess the usability of installed wiring and to diagnose and pinpoint problem areas. The products are compatible with AT&T's Premises Distribution System, the IBM Cabling System, coaxial and fiber-optic cable as well as older telephone wiring, 3Com said.

A major difference between 3Com's approach and that of similar products is the ability to multidrop or daisychain workstations, 3Com President William Krause claimed.

Pairtamer is an adapter that allows IEEE 802.3-standard Ethernet to be installed on one of the unused pairs from the three or more pairs of unshielded twisted-pair wires in a typical telephone cable. The adapter replaces the modular phone outlet normally used to connect the PC to the network.

The Multiconnect repeater ties local work groups either to other wiring centers and work groups or to an Ethernet backbone. A base repeater contains slots for 15 modules.

Lanscanner is a hand-held, battery-powered instrument that measures wire characteristics and determines the ability of a particular wire to handle data transmission.

Scheduled to be available in December, pricing is as follows: $325 for the Pairtamer set, including two adapters and an interface card to Multiconnect; $1,095 for the Multiconnect base unit and each expansion unit; $995 for Lanscanner; and $175 and $230, respectively, for connections to thick and thin Ethernet.

Two fiber-optic modules are available from Codenoll Technology Corp. in Yonkers, N.Y.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
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INSIDE LINES

Watch what we say, not what we do. Although DEC is often asked about its response to IBM's 9370, "We don't think there's anything to respond to," President Ken Olsen said last week during Decworld '87. But in the printed announcements of the next Microvax models, the 9370 is mentioned time and time again.

May need an extension. While IBM's OS/2 Extended Edition remains a mystery as far as availability goes (speculation pegs delivery at anywhere from first-quarter 1988 to sometime in 1989), what it will lack in ability is becoming clearer. According to one source who has seen the data base component, OS/2 Extended Edition lacks a full implementation of SQL. The source also characterised the product's report writer as weak, claiming it is unable to handle duties such as invoices.

Meanwhile, in the LAN o' plenty . . . Sources close to IBM say they are hearing hints that IBM will not endorse or use Microsoft's LAN Manager component of OS/2. Instead, they hear, the computer colossus will develop its own LAN manager — in effect building a proprietary wall around an otherwise open operating system. Only time will tell.

Reliving history. Computer Consoles Chairman and CEO John F. Cunningham, who bailed out of Wang as that company was heading down, said last week that Computer Consoles' previous profit projections are no longer attainable and that the company will cut its computer products division work force by 20%. As a restructuring measure, company officials said the 5-year-old division will focus efforts on its Unix-based Power 6 hardware line and its Office Power office automation systems in hopes of cutting division losses next year.

Let's get this straight. The Semiconductor Industry Association in the U.S., which used to bemoan low prices on Japanese semiconductors, last week passed a resolution stating that the Japanese are now artificially inflating prices. Although, as a result, U.S. consumers of Japanese semiconductors will pay higher prices, the association said U.S. semiconductor vendors still don't have unfettered access to the Japanese market, so trade sanctions should be maintained.

Dbo spu afbe uijt (a=b). Bridge Communications will soon be announcing what it claims is the first encryption product for a TCP/IP local-area network.

Another world. Novell is busy gearing up for Networld, its own trade show to be held in Dallas in October. Among the products Novell is said to be lining up is Netware for DEC's VMS, which won't ship until the first half of next year. Meanwhile, Novell subsidiary CXI, Inc. is expected to come out with a communications package that will replace Novell's old Ascom asynchronous gateway (an outmoded device, one industry source says, that was originally written from a Digital Research CP/M product). As a result, Netware network connections to asynchronous hosts should be vastly improved, he said.

Pitch a tent in the desert. The Interface Group, sponsor of Comdex, is crowing that the show has been completely sold out for the first time — all 7,200 booths. Show organizers say they are "desperately seeking more exhibit space," claiming that the Las Vegas extravaganza will be the biggest in the show's nine-year history.

D'language of choice. While the two top micro software firms, Lotus and Microsoft, gear up to enter the data base market — we just don't know exactly when — users and observers are asking what languages the products will support. According to a source knowledgeable about Ashton-Tate's Dbase, both companies have been checking out the wares of Dbase-compatible program makers, such as Fox Software and Wordtech, as a means of implementing the Dbase language. If Lotus were to announce a product that was language-compatible with Dbase, it would look odd in view of the lawsuits that Lotus has filed against firms that clone its products.

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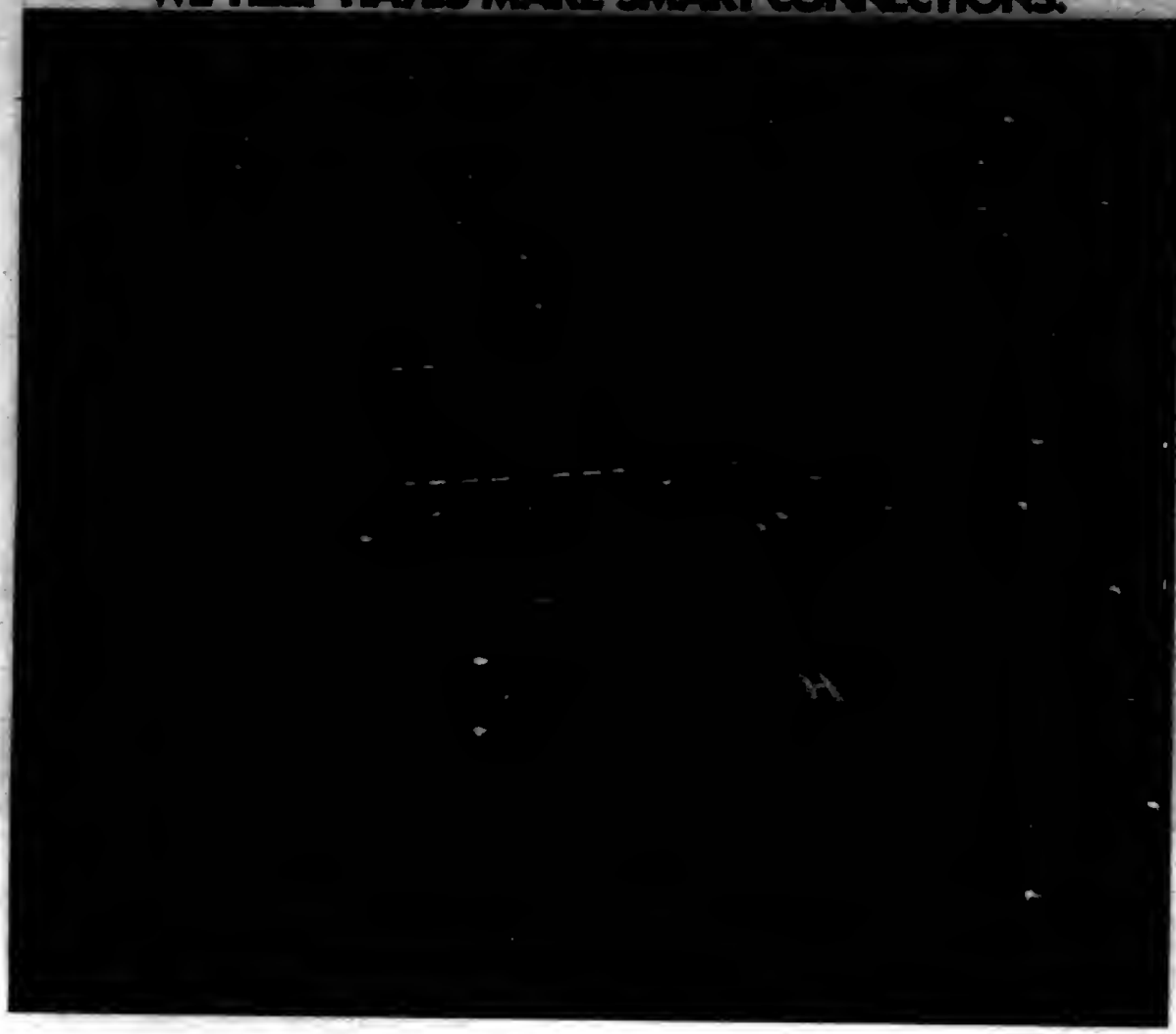

Hayes Microcomputer Products, Inc., is one of the premier successes in the electronics world. Hayes pioneered the personal computer modem a decade ago and still continues as the industry leader.

The company's rapid growth, however, has brought about its own set of growth needs. To help manage its expanding business Hayes needed flexible applications software. So they selected systems from Management Science America, Inc.

"The foremost reason we selected MSA was that the company is stable, with software on the market that offers tried and true solutions," comments Ken Voelker, Director of Hayes Information Management Group.

MSA's Manufacturing System provides Hayes the solution they wanted for integrating information in three key areas. Inventory Control has enabled Hayes to reduce warehousing, insurance and carrying costs, and free up capital for non-inventory investments. Material Requirements Planning saves Hayes significant time and money by generating requisitions automatically and sending them directly to Purchasing, providing buyers with more lead time to negotiate. And, because the Order Processing System has visibility into both inventory and manufacturing schedules, Hayes can take customer orders and make timely delivery.

Hayes views its relationship with MSA as a long term partnership. Adds Voelker, "We use MSA's Financial and Human Resource Systems as well as the Manufacturing System. We have an ongoing commitment from MSA and are confident we can depend on them for additional systems to meet our needs."

Connecting with MSA Software was a smart move for Hayes. It can be for your company, too. Call Robert Carpenter at (404) 239-2000.

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